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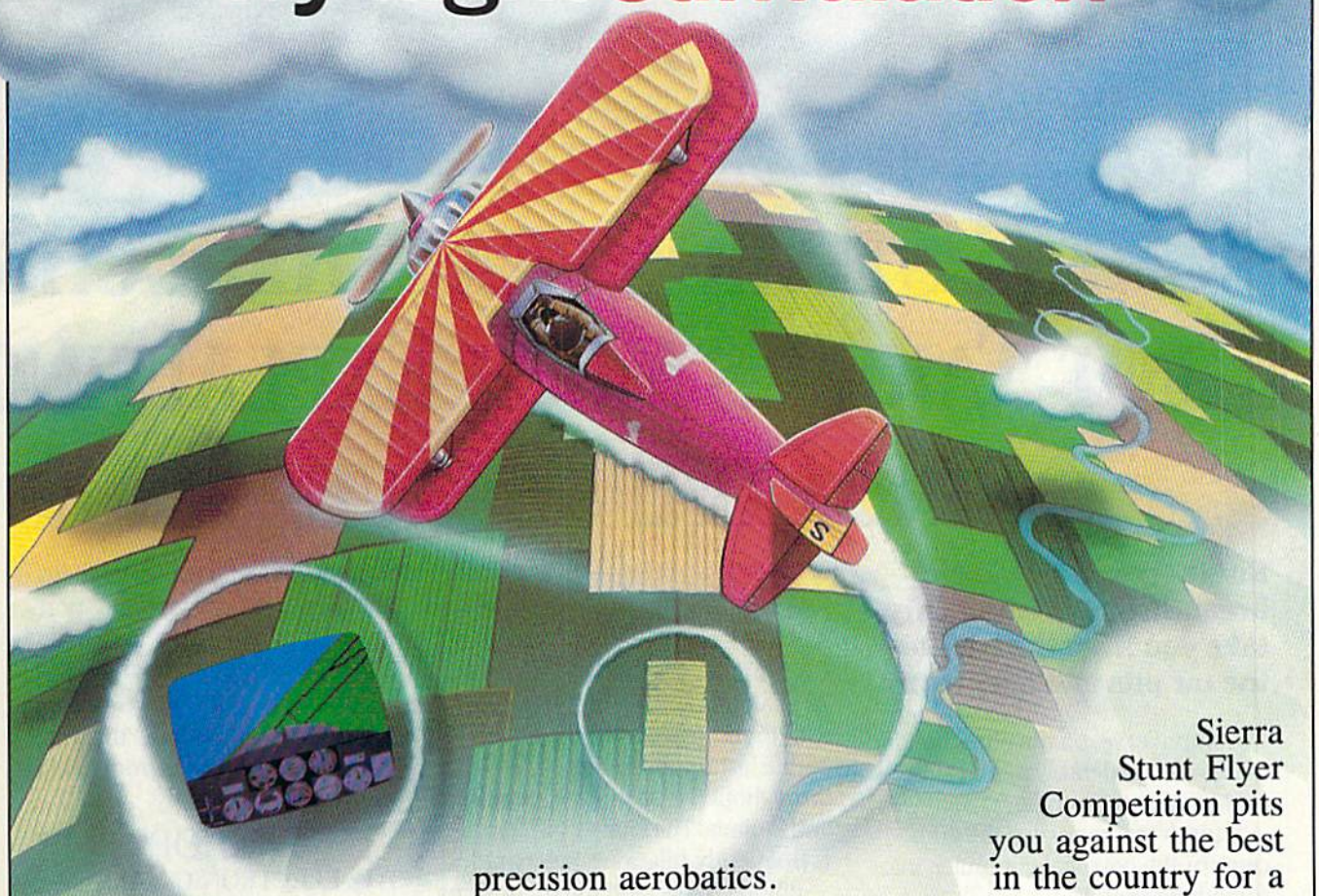

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First, relax.

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In fact, if you know how to buy breakfast, you already have the know-how you'll need to access any subject in our system. That's because it's "menu-driven," so beginners can simply read the menus (lists of options) that appear on their screens and then type in their selections.

Experts can skip the menus and just type in "GO" followed by the abbreviation for whatever topic they're after.

In case you ever get lost or confused, just type in "H" for help, and we'll immediately cut in with instructions that should save the day.

Besides, you can either ask questions online through our Feedback service or phone our Customer Service Department.

How to subscribe.

To access CompuServe, you'll need a CompuServe Subscription Kit, a computer, a modem to connect your computer to your phone, and in some cases, easy-to-use communications software. (Check the information that comes with your modem.)

With your Subscription Kit, you'll receive:

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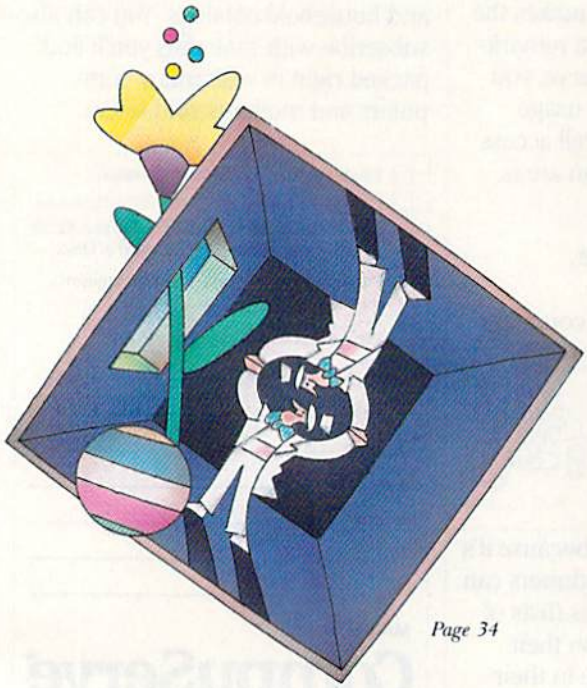

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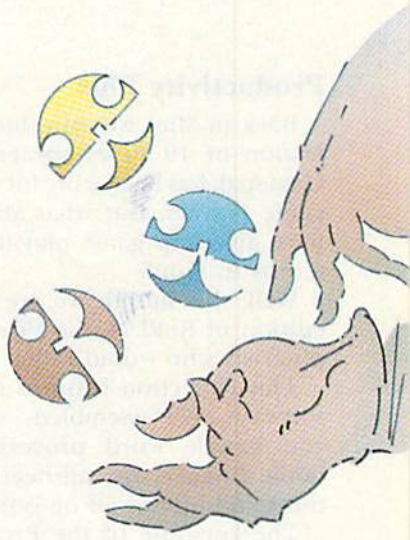

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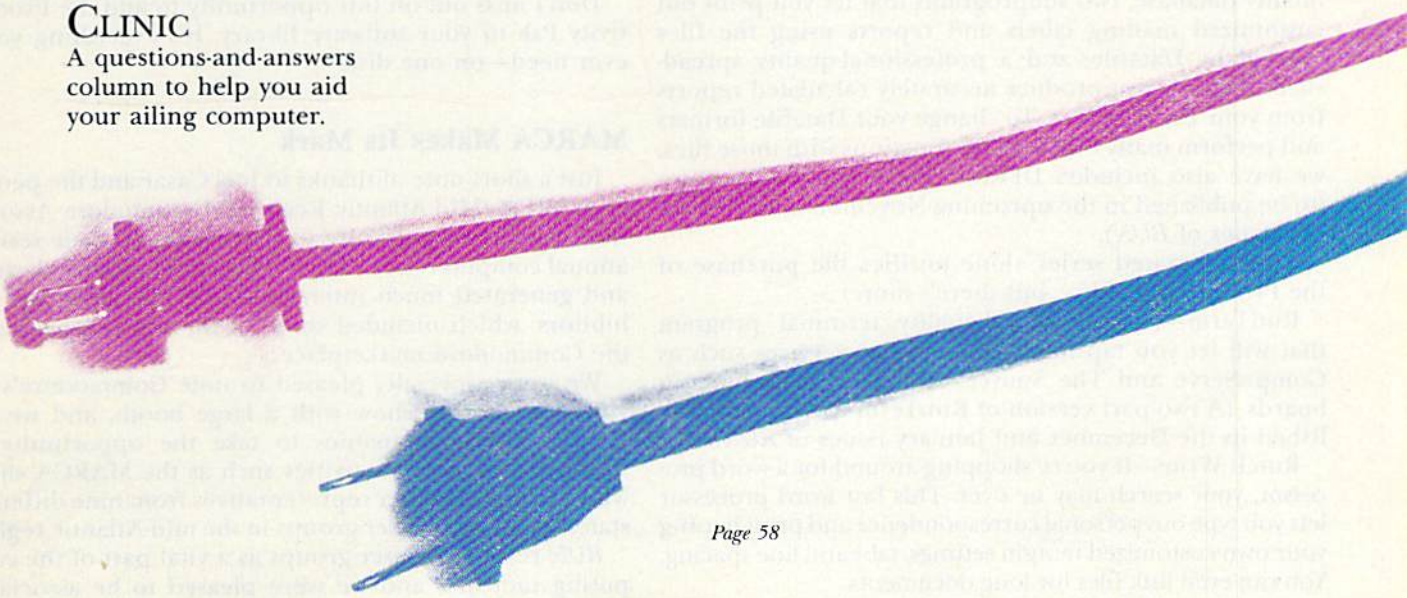

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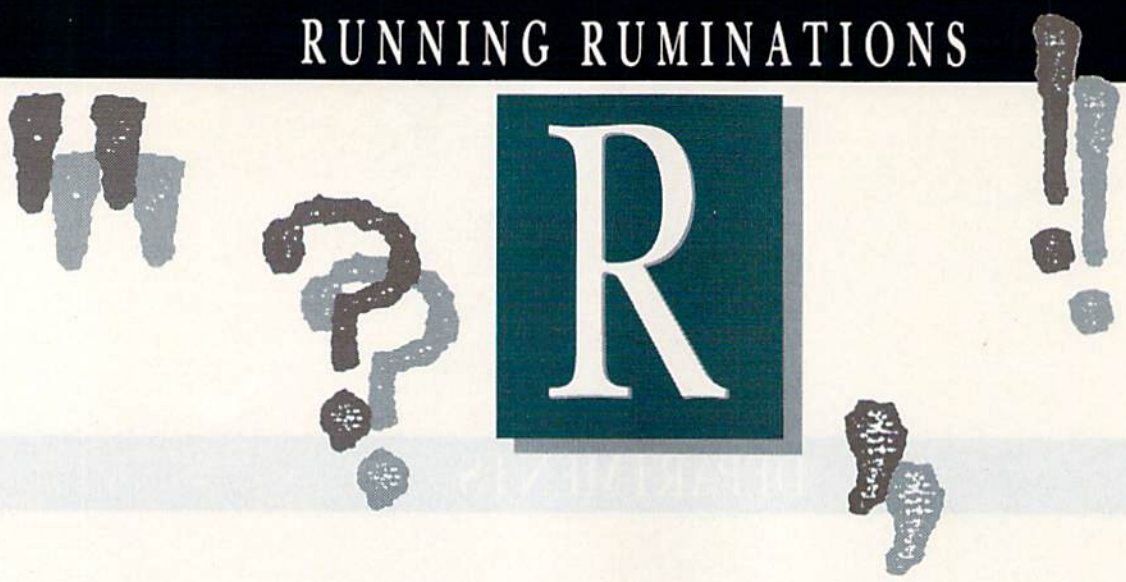

Productivity Plus

Back in May, we introduced the *RUN* Gamepak, a collection of 19 super games on disk for the C-64. The Gamepak has been a big hit among our readers, especially game players. But what about those computerists who have given up game playing and have more serious interests in mind?

Well, this month we are introducing another special edition of ReRUN, the Productivity Pak, for those computerists who would rather work than play.

This collection features some of the most productive software ever assembled—top-quality programs that let you handle word processing, database management, home finance, spreadsheet calculating, telecommunications and more—all on one disk.

The keystone of the Productivity Pak is the Datafile series, far and away *RUN*'s best and most popular program published to date. First appearing in the November and December issues of *RUN*, Datafile has undergone several revisions and enhancements. It is a superior program, now in widespread use by *RUN* readers.

The Productivity Pak features the latest version of the popular Datafile series, which includes a professional-quality database, two subprograms that let you print out customized mailing labels and reports using the files created by Datafile, and a professional-quality spreadsheet that lets you produce accurately calculated reports from your Datafile files. To change your Datafile formats and perform many other useful functions with those files, we have also included DFRestructure and DFStructure (to be published in the upcoming November and December issues of *RUN*).

This integrated series alone justifies the purchase of the Productivity Pak. . . but there's more:

RunTerm—a professional-quality terminal program that will let you tap into major on-line services such as CompuServe and The Source, as well as local bulletin boards. (A two-part version of RunTerm will also be published in the December and January issues of *RUN*.)

Run It Write—If you're shopping around for a word processor, your search may be over. This fast word processor lets you type out personal correspondence and print it using your own customized margin settings, tabs and line spacing. You can even link files for long documents.

Disk Master—C-64 disk owners will appreciate this disk utility (previously published in *RUN*) to help you keep track of all the program files on your disk.

Screen Print—Who are you going to turn to when you need a quick printout of your screen display? Try this versatile program, which will print out text, high-resolution or low-resolution displays.

Basic 4.5—This program enhances the power of your C-64 with Basic 4.0 commands, plus sprite graphics, music, windows and additional disk commands.

Finance Aid—This program will keep your home finances in order by determining your mortgage loan payments or calculating the future value of your investments.

Graph Maker 64 and Memo—These programs are a must for the busy businessman, but can also be used for non-business applications. Graph Maker lets you create, save and print colorful vertical bar graphs on the C-64. Memo creates an appointment file and calendar for the computerist with a busy schedule.

You can take advantage of this opportunity to increase your personal productivity by calling toll-free 1-800-258-5473, or writing to ReRUN, CW Communications/Peterborough, 80 Pine St., Peterborough, NH 03458. Productivity Pak programs will run on the C-64 and C-128 (in C-64 mode) on disk only.

Don't miss out on this opportunity to add the Productivity Pak to your software library. It's everything you'll ever need—on one disk.

MARCA Makes Its Mark

Just a short note of thanks to Joel Casar and the people of MARCA (Mid-Atlantic Regional Commodore Association) for the opportunity to participate in their second annual computer user's fair. It was a well-organized event, and generated much interest among attendees and exhibitors, which included some of the top companies in the Commodore marketplace.

We were especially pleased to note Commodore's involvement at the show with a large booth, and we encourage more companies to take the opportunity to support user group activities such as the MARCA show, which brings together representatives from nine different states, or about 60 user groups in the mid-Atlantic region.

RUN recognizes user groups as a vital part of the computing industry, and we were pleased to be associated with the show, which has become a significant stop on the Commodore show circuit. **db**

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GUARANTEED SOFTWARE

NEW

VIZASTAR for the C128

Vizastar, the integrated spreadsheet, database and graphics program that has the Commodore 64 world raving, is now available for the C128. It boasts 80 columns, and has over 40K of free memory in the spreadsheet. Those who already own Vizastar 64 will be pleased to know that your existing files can be read by Vizastar 128. Also, you can upgrade to the 128 version. Call us for details and pricing.

"The only other comparable product would be Lotus 1-2-3 for the IBM PC; nothing in the C64 world comes even close to the features of Vizastar."
AHOY July 85

"I found Vizastar would do anything Lotus 1-2-3 could, and then some. It's my Commodore choice to become the standard against which the others will be judged."
INFO 64 Magazine, Issue #7

"Vizastar is an exceptional package that rivals the features of programs such as Lotus 1-2-3 and offers C64 owners the kind of integrated software previously only available for higher-priced systems."
RUN Magazine, June 1985

"I scrutinized, tested and experimented with Vizastar extensively, but could find no weaknesses whatsoever. It is the most comprehensive, most flexible, most powerful and easiest to use integrated software package I've worked with."
Commodore Microcomputer, Sept/Oct 1985

"I use an IBM PC at work with Lotus 123. I feel Vizastar is just as good and in someways better than 1-2-3."
Steven Roberson, NC. End User

"I have used Multiplan and Superbase; both are good pieces of software, but are inadequate when compared to Vizastar."
Jim Mathews, WA. End User

"So good, I bought a second C64 and Vizastar for my office. A wild bargain! You've saved me from having to buy IBM and Lotus."
Philip Ressler, MA. End User

NEW

VIZAWRITE CLASSIC for C128

This is the new word processor from Vizastar's author, Kevin Lacy and is the successor to Omniwriter, which he also wrote. All the features of Omniwriter are there, plus many significant enhancements, like auto pagination, on-line help, pull-down menus, full-function calculator and more. Up to 8 'newspaper-style' variable-width columns can help with newsletters.

Three different proportionally-spaced "near letter quality" fonts are also built-in for use with Commodore or Epson compatible printers. You can merge almost any other word processor file directly into Vizawrite, including Paper Clip and Omniwriter. Naturally, it is also compatible with Vizastar. At all times, what you see on the screen is exactly the way it will be printed out. Vizawrite can do mail-merges and has an integrated 30,000 word spelling checker that you can expand yourself.

PROGRAM SPECIFICATIONS

Both Vizawrite and Vizastar are written in 100% machine language and run in the 128's FAST mode, making it lightning fast. They require a C128 with 80 column color or monochrome monitor. Both come with a cartridge, a diskette, a backup, and a reference manual. Vizastar also includes a 50 page tutorial book. Both work with 1541 or 1571 disk drives.

RISK-FREE OFFER

Vizastar 128 is priced at $119.97. Vizawrite's price is $79.97, but as an introductory offer, it is now only $69.97. Vizastar 64 XL8 is now available for $119.97. We are so positive you will be satisfied with our programs that we offer a 15-day money-back guarantee. Try it Risk-Free. Call us today or send a check or money order. VISA/MC accepted.

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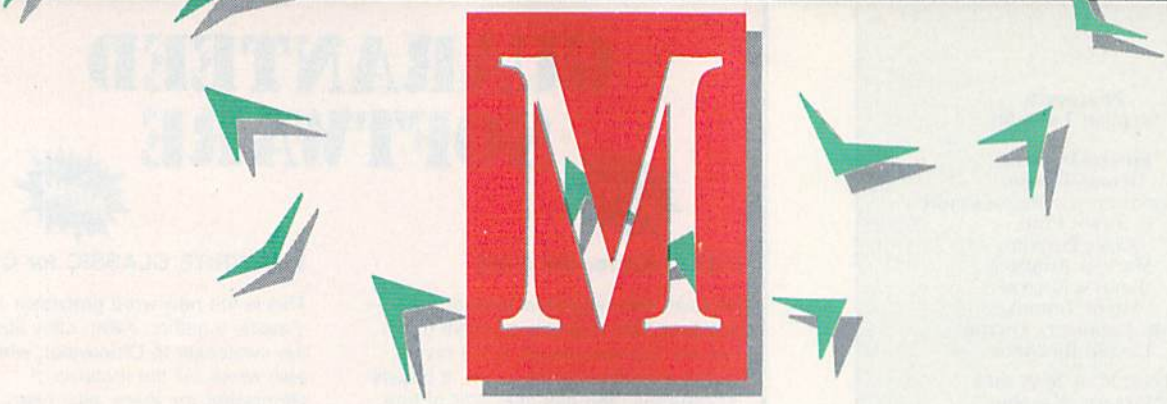


Compiled by LOUIS F. SANDER

MAGIC is tricks, MAGIC is fun.
MAGIC is doing what cannot be done.

Every month, Magic brings you brief and useful computer tricks from around the world—tricks to make computing easier, more enjoyable or more exciting. We number our tricks in hex, the counting system of sorcerers and computerists.

Magic solicits your simple hardware ideas, short programs, useful programming techniques, little-known computer facts and similar items of interest. We look for new or recycled material that can be implemented with a minimum of time, effort or theoretical knowledge and that is of current value to Commodore computerists (Plus/4 and C-16 owners, too). RUN *will pay up to $50 for each trick accepted. Send your tricks to:*

MAGIC
c/o Louis F. Sander
PO Box 101011
Pittsburgh, PA 15237

If you enclose a self-addressed stamped envelope, we'll send you a Trick Writer's Guide. Readers outside the United States may omit the stamp.

Although this *RUN* is dated October, most of you get it in the dog days of September, so this issue includes alchemy appropriate to both months. And, speaking of seasonality, we like to print tricks with a seasonal theme, but we never get enough of them. So, if you'd like to be a published magician, work up some seasonal trickery for us and your fellow readers. Remember our deadline—three months prior to publication.

RUN's 1986 special issue is coming along fantastically now, and we know you're going to like it. It contains a reprint of 1985's Magic, plus a wealth of new material, all sorted and indexed in various ways.

$251 PET Emulator—Once upon a time, most Commodore software was written for the famous PET computer. In those fond and bygone days, a powerful program called PET Emulator made the software-poor C-64 compatible with the extensive library of PET-based programs. The emulation idea was a dog, but it gave you something to do until better software appeared.

The amusing program below is much less powerful, but much more friendly. It *does* faithfully emulate a plug-compatible Commodore PET, and it works on all Commodore machines, including the C-128. Type it in right now and stand by for a pleasant surprise. Don't overlook the numerous spaces that are imbedded in the graphics strings; they appear as extra wide gaps adjacent to the curly brackets.

```
10Ø REM PET EMULATOR - LOUIS F. SANDER
11Ø DIMA$(2Ø):A$=" {CTRL 9}":A$(15)="{CTRL
    3}{CTRL Ø} ."
12Ø A$(16)="{SHFT LB.} {COMD *}":A$(17)="{C
    OMD G} {COMD M}":PRINT CHR$(142)
13Ø A$(18)="{CTRL Ø}{CRSR LF}{COMD C}{CTRL
    9}{COMD G}{SHFT W}{COMD M}{CTRL Ø}{COMD
     V}":A$(19)=A$(17)
14Ø A$(2Ø)="{3 COMD Is}{CTRL 1}":A$(Ø)="{SH
    FT CLR}":B$="{SHFT J}"
15Ø C$=B$+"{2 COMD Is}{SHFT Q}{CRSR DN}{4 C
    RSR LFs} {COMD V}{COMD C} {CRSR UP}":D$
    =" {CRSR DN}{CRSR LF} {CRSR UP}"
16Ø E$="{HOME}{19 CRSR DNs}"
17Ø F$=E$+"{13 CRSR RTs}":G$="{SHFT U}"
18Ø POKE5328Ø,1:POKE53281,1:FORJ=ØTO2Ø
19Ø PRINTSPC(16)A$A$(J):NEXT:PRINTE$C$
2ØØ FORJ=1TO13:FORK=1TO2ØØ:NEXT
21Ø C$=D$+C$:PRINTE$C$:NEXT:FORJ=1TO1Ø
22Ø FORK=1TO72:NEXT:PRINTF$G$
23Ø FORK=1TO68:NEXTK:PRINTF$;B$:NEXT
```

Louis F. Sander
Pittsburgh, PA

$252 Halloween disk devilment—For a real trick or treat, prepare a disk with a number of interesting programs on it, and tell a friend you're going to give it to him as a Halloween treat. Make sure it contains the following one-line program, named "DO NOT RUN ME."

```
10 OPEN 15,8,15,"N0:I WARNED YOU!,TS" : CLOSE15
```

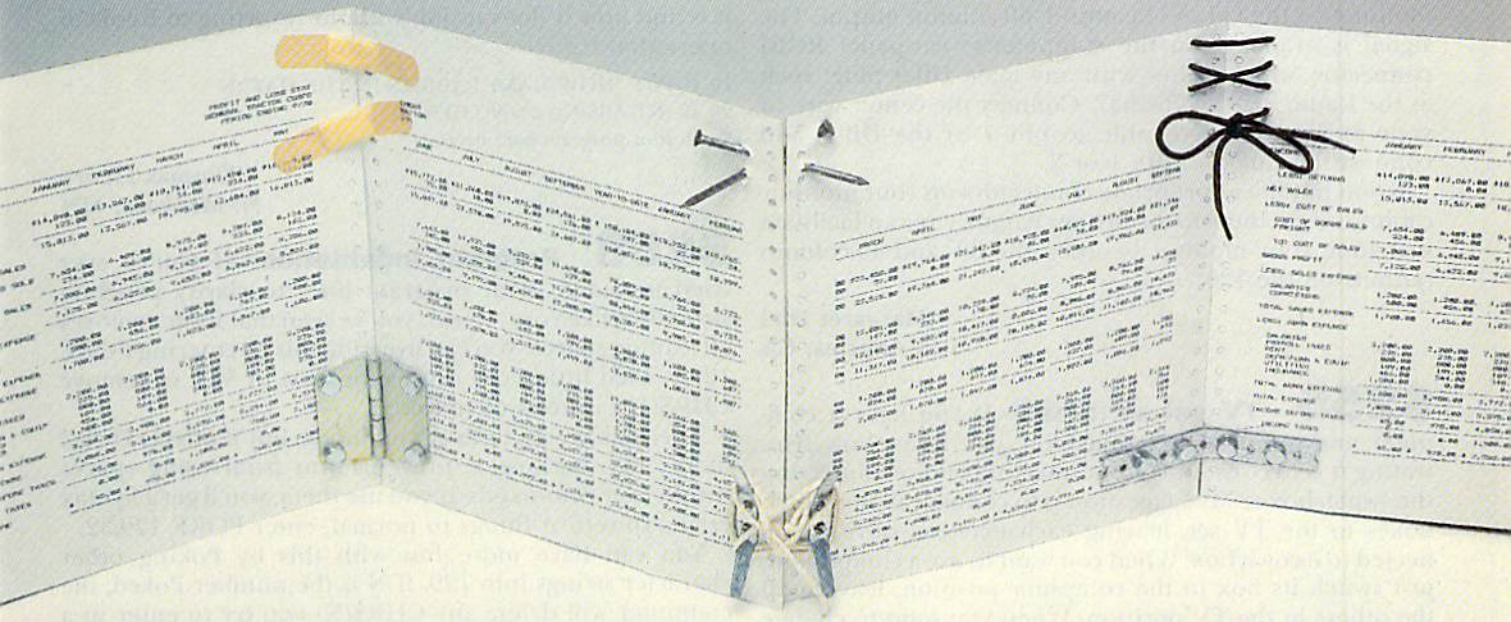
The trick comes when he runs the forbidden program, which erases everything on the disk!

Bertram Schulman
Valley Stream, NY

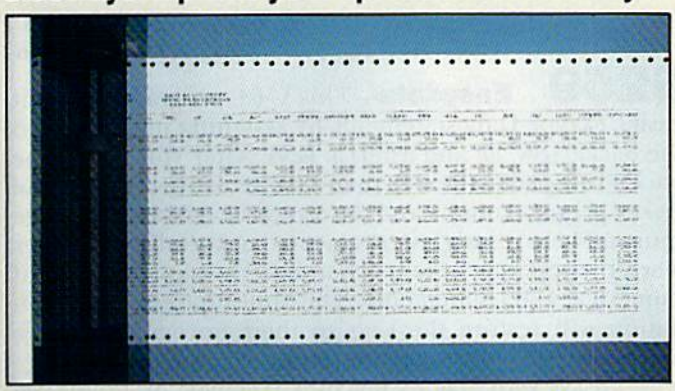
$253 Address books—If you wish to have a neat, up-to-date and correctable address and telephone book, there's an available framework in Practicalc or any similar spreadsheet.

Using the spreadsheet columns, you can enter, in any

SIDEWAYS... A NEW PROGRAM THAT SOLVES AN OLD PROBLEM.



Sideways. It prints your spreadsheet sideways.



The problem with spreadsheets is they get printed the wrong way. You still have lots of stapling and taping to look forward to before your printout is ready. Now, with SIDEWAYS, you can print a spreadsheet report that's wider than your printer paper – vertically, all at one time, on one continuous page.

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SIDEWAYS rotates your spreadsheet 90 degrees as it prints out, causing your hard copy to print sideways. Nothing you create with today's most popular spreadsheet programs* is too wide for SIDEWAYS.

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Now, get rid of that stapler and tape for good – go SIDEWAYS. Available now at your favorite dealer for only $29.95.**

***COMPATIBILITY:** Sideways works with any C-64 or C-128 spreadsheet program that can create text file information (ASCII) on a disk, or interfaces with a word processor. SIDEWAYS also works with these spreadsheet programs: Better Working Spreadsheet, Calc Now, Cal-Kit, Creative Calc, Multiplan, Practicalc, Syncalc, and Trio. Timeworks's SWIFTCALC already includes SIDEWAYS.

For Commodore 64 and 128 Computers.***

**Manu. Sug. Retail Price. ***Reg. TM of Commodore Computer Systems

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Circle 2 on Reader Service card.

order, names, phone numbers and personal details. The columns can then be sorted alphabetically or numerically by Practicalc, and changes or corrections can be handled with ease.

Ian Haynes
Westville, South Africa

$254 C-128 monochrome monitor—The manual doesn't say so, but it's easy to use a monochrome monitor on the C-128's beautiful, 80-column output. The signal is available on the computer's rear-panel RGBI connector, which mates with any male DB-9 plug, such as the Radio Shack 276-1537. Connect the center wire of your monitor's video cable to pin 7 of the DB-9, and connect the shield to pin 1 or 2.

If you put the appropriate connectors on your monitor cables and cut them to the proper length, you can facilitate switching your monitor between the 80- and 40-column outputs on the 128.

Margaret Ittel
Los Angeles, CA

$255 TV set switches—If you have a computer and a video game machine, you know how frustrating it is to constantly be connecting and reconnecting the switch boxes. My suggestion is to connect all the switch boxes to the TV set, leaving each external device connected to its own box. When you want to use a component, just switch its box to the computer position, leaving all the others in the TV position. When you want to change components, just turn the first one to TV and the second one to computer.

Michael Peterman
Lebanon, OR

$256 Screen reverser—The accompanying C-64 program lets you reverse the entire screen by executing a simple SYS. Characters in normal video are changed to reverse video, and those in reverse are changed to normal. Because of the speed of machine language, the change is instantaneous.

To use the feature in a program, just execute lines 30–34 one time, then execute SYS 52992 whenever you want to reverse the screen. Some uses might be a flashing screen as a reward in a educational program, a flashing arcade game screen or even a flashing sign. Use your imagination and have fun!

```
1 FORY=1TO27:READZ:CS=CS+Z:NEXT
2 IFCS<>4345THENPRINT"DATA ERROR":STOP
3 PRINT"CHECKSUM OK. DELETE LINES 1-4,"
4 PRINT"THEN SAVE THE PROGRAM.":END
10 REM SCREEN REVERSER - RICHARD MIU
20 REM SYS52992 REVERSES THE SCREEN
30 FORJ=52992TO53018:READK:POKEJ,K:NEXT
31 DATA 169,000,133,251,169,004,133,252
32 DATA 162,004,160,000,177,251,073,128
33 DATA 145,251,200,208,247,230,252,202
34 DATA 208,240,096
```

Richard Miu
Mansfield, OH

$257 Easy Input filter—Many real-world problems only make sense if the input data is made up of non-negative integers. For example, when inputting the number of items in an inventory, you must make sure there are no negative numbers or fractions.

Of course, the programmer's sacred duty in these cases is to trap erroneous input responses before they can cause problems. Here's an elegant input filter that excludes both fractions and negative numbers. Notice how simple it is and how it does its job without resorting to Boolean operators.

```
10 INPUT "HOW MANY RABBITS IN THE HAT";N
20 IF INT(ABS(N))<>N THEN 10
30 Rest of program goes here.
```

Thomas Henry
N. Mankato, MN

**$258 Program indentation**—If you've ever tried to indent your program lines to clarify program structures like For. . . Next, you've seen that Basic removes all leading spaces. You can override this by entering POKE 129,1. That little Poke causes the C-64 or VIC to remove CHR$(1)'s instead of spaces!

The trick works in Program mode, but it affects Direct mode, too, because it prevents you from using spaces inside your commands. If you use them, you'll get a Syntax error. To return things to normal, enter POKE 129,32.

You can have more fun with this by Poking other character strings into 129. If N is the number Poked, the computer will delete any CHR$(N) you try to enter in a program or Direct mode line.

Gustavo A. Tolosa A.
Mexico City, Mexico

$259 Easydata—This C-64 program makes it easier to type Data statements by assigning new values to the backarrow, @ and asterisk keys. After you run it, the backarrow prints the shorthand abbreviation of Data, the @ key prints a comma and the asterisk executes a carriage return. These reassignments mean that your fingers never leave the top row of keys when entering long listings of numerical Data statements. The run/stop/restore combination will restore the keys to their normal functions, while SYS900 will reactivate the Easydata feature.

As always with Magic's machine language programs, we have included a checksum routine to make sure you enter your data items correctly. The first time you run the program, you'll be informed if you made a typing error or that everything's all right. If all is well, delete lines 1–4, then save the program in the usual way.

```
1 FORY=1TO83:READZ:CS=CS+Z:NEXT
2 IFCS<>9260THENPRINT"DATA ERROR":STOP
3 PRINT"CHECKSUM OK. DELETE LINES 1-4,"
4 PRINT"THEN SAVE THE PROGRAM.":END
10 REM EASYDATA - MARK GRANZOW
11 DATA 120,162,145,160,003,142,020,003
12 DATA 140,021,003,088,096,072,165,215
13 DATA 201,095,208,021,169,157,141,119
14 DATA 002,169,068,141,120,002,169,097
15 DATA 141,121,002,169,003,133,198,240
16 DATA 038,201,064,208,016,169,157,141
```

Continued on p. 72.

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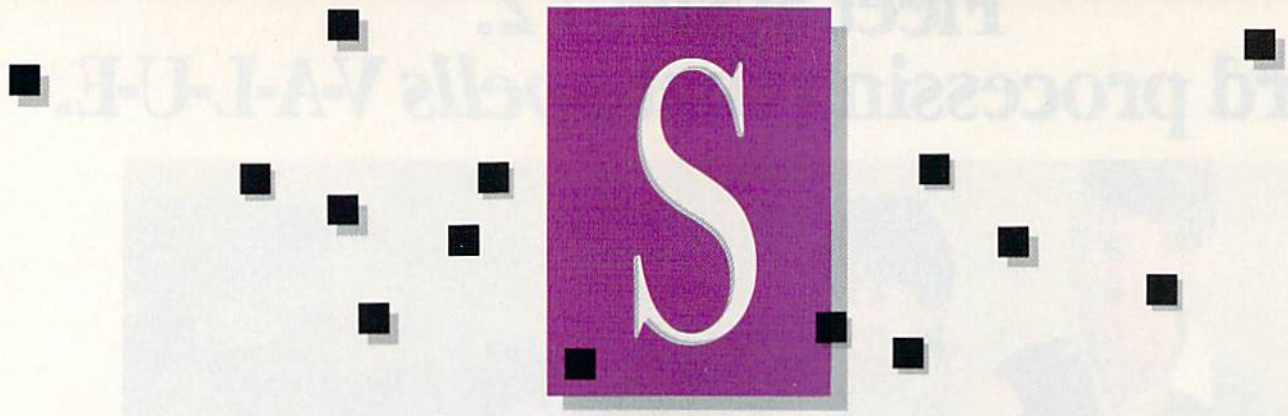

Compiled by SUSAN TANONA

Blazing Paddles B

A Graphics Program That Will Bring Out The Artist in You

Blazing Paddles is a most unusual and interesting graphics program for the Commodore 64.

The first feature you'll notice about the program is how many different input devices you can use with it. Blazing Paddles accepts input from a touch tablet, a paddle, a joystick, a trackball or a light pen.

Main menu options include Clear, Window, Text, Shapes, Disk, Printer, Zoom, Spray, Color, Fill, Lines, Dots, Sketch and Box.

Several of the main menu selections bring up a second set of options. Clear displays another menu that allows you to select the color to be used to clear the screen. Window gives you a choice of Cut or Paste.

The Color option allows you to mix various base colors to create up to 200 different colors and textured hues. The Disk option allows you to save and load a picture or window, load a shape table or a character set, view the disk directory and send disk commands.

One helpful feature is the Zoom option, which gives a magnified view of a small portion of the screen so that you can make pixel-by-pixel changes.

In case your drawing abilities aren't the best, the program offers nine shape tables to help you get started. These tables provide such diverse choices as transportation, plants, faceparts, animals, weapons, characters and miscellaneous. Each table has a number of shapes that may be rotated, flipped and drawn in a variety of colors on the main screen.

You can add text anywhere in up to four different types of fonts—standard, script, bold and italics.

One of the best features of Blazing Paddles is the Undo option, which allows you to erase the last mark that you made.

I do have a couple of complaints about the program. When you are using a joystick to sketch, the speed is too fast and there is no way to slow it down. Also, I was unable to back out of the Clear function once I had chosen it, although the program indicated that this was possible.

My major criticisms are of a more general nature. First, Blazing Paddles only supports three brands of printers—Epson, Gemini and the Commodore 1525—but the outside of the package doesn't tell you this. If you buy the package and don't own one of these printers, you're simply out of luck.

Second, although the manufacturer indicates that one of the package's applications is program development, the documentation provides no information on this. At the very least, the screen's memory location and some type of Basic loader should be provided.

In summary, if you have one of the supported printers, I would recommend Blazing Paddles. It's a solid graphics program that offers you many useful options. *(Baudville, Inc., 1001 Medical Park Drive SE, Grand Rapids, MI 49506. C-64/$34.95 disk.)*

Brooks Hunt
Alexandria, VA

Report Card

A ***Superb!*** An exceptional program that outshines all others.

B ***Very Good.*** One of the better programs available in its category. A worthy addition to your software library.

C ***Good.*** Lives up to its billing. No hassles, headaches or disappointments here.

D ***Mediocre.*** There are some problems with this program. There are better on the market.

E ***Poor.*** Substandard, with many problems. Should be deepsixed!

Dave Winfield's Batter Up! A

Let this Pro Show You What It Takes To Be a Real Slugger

It's the dream of a hot day in July, when the air is so still the crack of a bat can be heard for miles. It's the dream of standing at home plate in Yankee Stadium and knocking one out of the park. And it's all here in Dave Winfield's Batter Up!

Batter Up! is actually two programs

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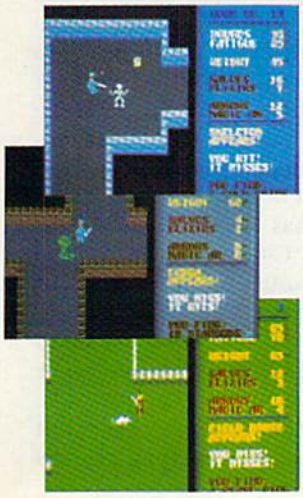

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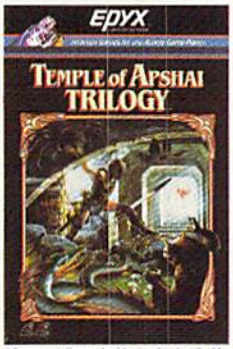
Temple of Apshai Trilogy	✓	✓	✓	✓	✓



*See specially marked boxes for details. No purchase necessary. Sweepstakes ends December 31, 1985. Official rules available at participating retailers. T-shirts available while supplies last.

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Strategy Games for the Action-Game Player

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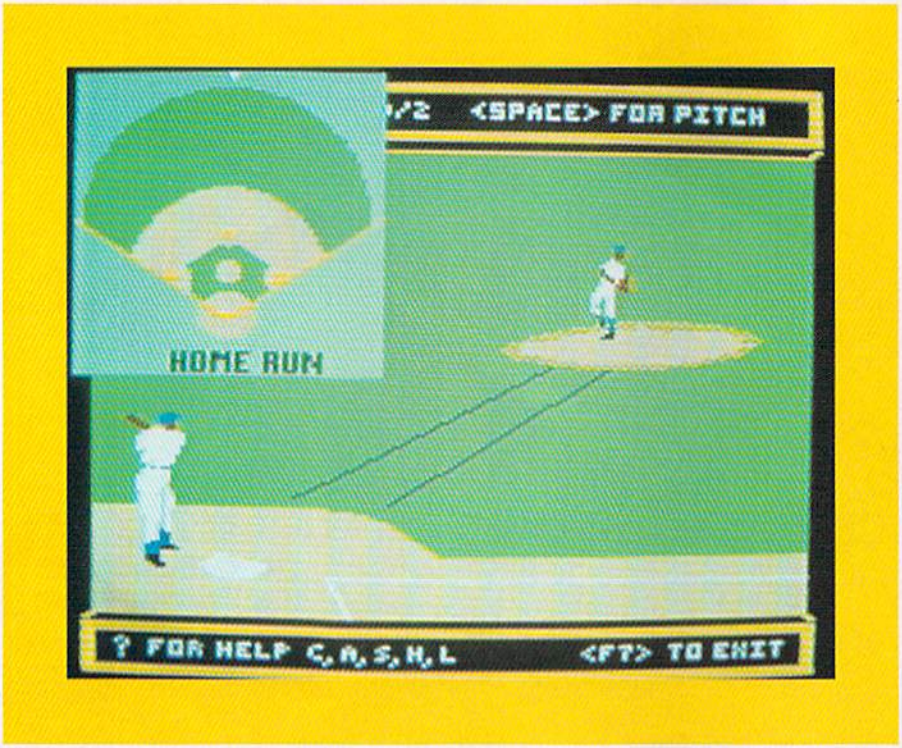

on a single disk. Choose A Lesson with Dave and you'll find an excellent tutorial on the art of hitting. Choose Slugfest (on the flip side) and indulge yourself in facing the best pitchers your league can offer.

The tutorial offers menus and submenus that allow a wide variety of configurations. First, you choose a grip on the bat—high-resolution graphics, accompanied by Winfield's comments, leave no doubt as to what finger goes where.

Next, choose from one of three stances. You can then put your player through the motions and watch his swing and follow-through. You can view him in normal speed, slow motion or frame by frame. All of these options feature excellent graphics and animation.

Next, choose from a menu of pitches—slider, curveball, knuckleball and so on—as well as whether you wish the pitcher to be right- or left-handed. Two views of the pitch are shown (one from the side, the other from overhead) so that you can see just how a ball breaks across the plate.

The Swing option allows you to choose swing paths and the Hitting Strategies feature allows you to set up a hypothetical situation. This option is accompanied by Winfield's comments that tell you how and why he would hit in such a situation.

Because the program explains the why as well as the how, I give this tutorial very high marks. And, while any amateur ballplayer can learn much from just the animated simulations, a fine illustrated book accompanies the disk so that you may continue your studies away from the computer.

Once you know what you're doing and why, it's time to flip the disk and enjoy Slugfest. Here, the same rules apply, but a terrific play value has also been added.

First, choose from one of eight pitchers, each modeled after a real-life star. Your choice of the league in which you'll play sets a difficulty level. Decide whether you'll hit right- or left-handed, choose a stadium in which to play, and you're ready to go.

Although you may control your swing from the keyboard, I found the joystick much more to my liking. If you get a hit, an inset appears in one corner of your screen, showing a bird's-eye view of the stadium and tracing the path of your ball. Your hit is then called—double, triple, home run, out—and your batting average goes into a file, which you may choose to save.

Somewhere deep in your computer, a chip has put together all the variables, such as type of pitch, pitcher, height and timing of swing, batting stance and so on, and gives you the results by calling the hit.

Dave Winfield's Batter Up!, because it is a simulation with almost endless variables, succeeds as a tutorial on hitting. Because of its excellent graphics, superb animation and high play value, it also succeeds as a game worth playing again and again. With all its variations, you need never play the same game twice.

To all this, I add that it is truly original, far removed from the computerized baseball games of yesteryear. *(Avant-Garde Publishing Corp., 37B Commercial Blvd., Novato, CA 94947. C-64/$34.95 disk.)*

Ervin Bobo
St. Peters, MO

Rainy Day Fun

B

Here's a Mixed Bag of Activities to Be Put Away for a Rainy Day

Rainy Day Fun is an entertainment package for kids. Intended to be used by children as young as five years of age with minimal adult supervision, this entry into the crowded field of children's software contains a variety of ten playtime activities.

The package consists of two disks and a well organized 28-page instruction book. The main menu features pictorial representations of each of the ten activities. Using the joystick, it is a simple task to move the on-screen hand until the finger points to the child's choice.

Each disk has Apple software on one side and C-64 software on the other. Unfortunately, both sides of each disk are practically identical, so a child must be able to read the small print on the disk in order to choose the correct side.

The potential for disk confusion increases after an activity is chosen

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Summer II	✓				✓
Winter	✓	✓			✓
Baseball	✓			✓	✓
Football	✓				✓

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**Your free hour is available weekends and weekdays after 6 p.m.

from the menu. If the required files are on the second disk, an instruction to change disks appears at the bottom of the screen and the disk drive's error light blinks. A young child will have to be taught to look for this message. While these appear to be relatively insignificant details, the easy-to-commit error of inserting the second disk with the Apple side up causes the entire program to crash.

Almost all of the activities rely solely on the joystick for ease of play. Some of the games, such as Pin the Tail on the Donkey and Mouse Maze, are quite simple.

Another group of activities favors drawing and coloring. The Coloring Book offers more than 50 different pictures to draw or color, while Dot to Dot has 40 partial pictures that the child can complete. Mask Maker features a face that can be changed, feature by feature, into a frightening creature or a realistic human. Screen images can be modified with an easy-to-use draw/erase function that uses a joystick-controlled pencil or eraser with four different speeds and various widths and colors.

The child can create paper airplanes on the screen by following the pattern that is displayed, but they are easier to make from a printout with lines indicating the folds. Anything created on-screen can be printed out, although there is no provision for saving the masterpieces to disk. I also would like to see a Fill command included.

The Banner Maker features three type styles and 50 picture designs. Banners can be up to 128 characters in length, in either vertical or horizontal formats. Best of all, you can intermix text and graphics, changing font types as you go. Another handy activity allows you to create customized party invitations. The usefulness of these two activities isn't limited only to children, and together, they are easily worth the price of the entire package.

Although you can enjoy many of the activities in Rainy Day Fun even if you don't have access to a printer, the fun and utility of the program are sharply curtailed without one. To my disappointment, this program supports a very limited number of printers—Commodore, Epson and Okidata. (Also, a small addendum to the documentation informs you that any interface other than the Card/ ? + G "may not produce the desired results.")

While Thorn EMI has an excellent concept in Rainy Day Fun, their implementation of the program leaves a bit to be desired. The poor disk-error handling and limited printer compatibility are flaws in what might otherwise be an enjoyable afternoon's entertainment for you and your child. *(Thorn EMI Computer Software, PO Box 10425, Costa Mesa, CA 92626. C-64/$39.95 disk.)*

John Premack
Lexington, MA

Karateka

Experience the Thrill of A Karate Match Without Risking Life and Limb

Few of the games on the market for the Commodore 64 give you the kinds of kicks you get with Karateka. Both figuratively and literally, this game is a hit.

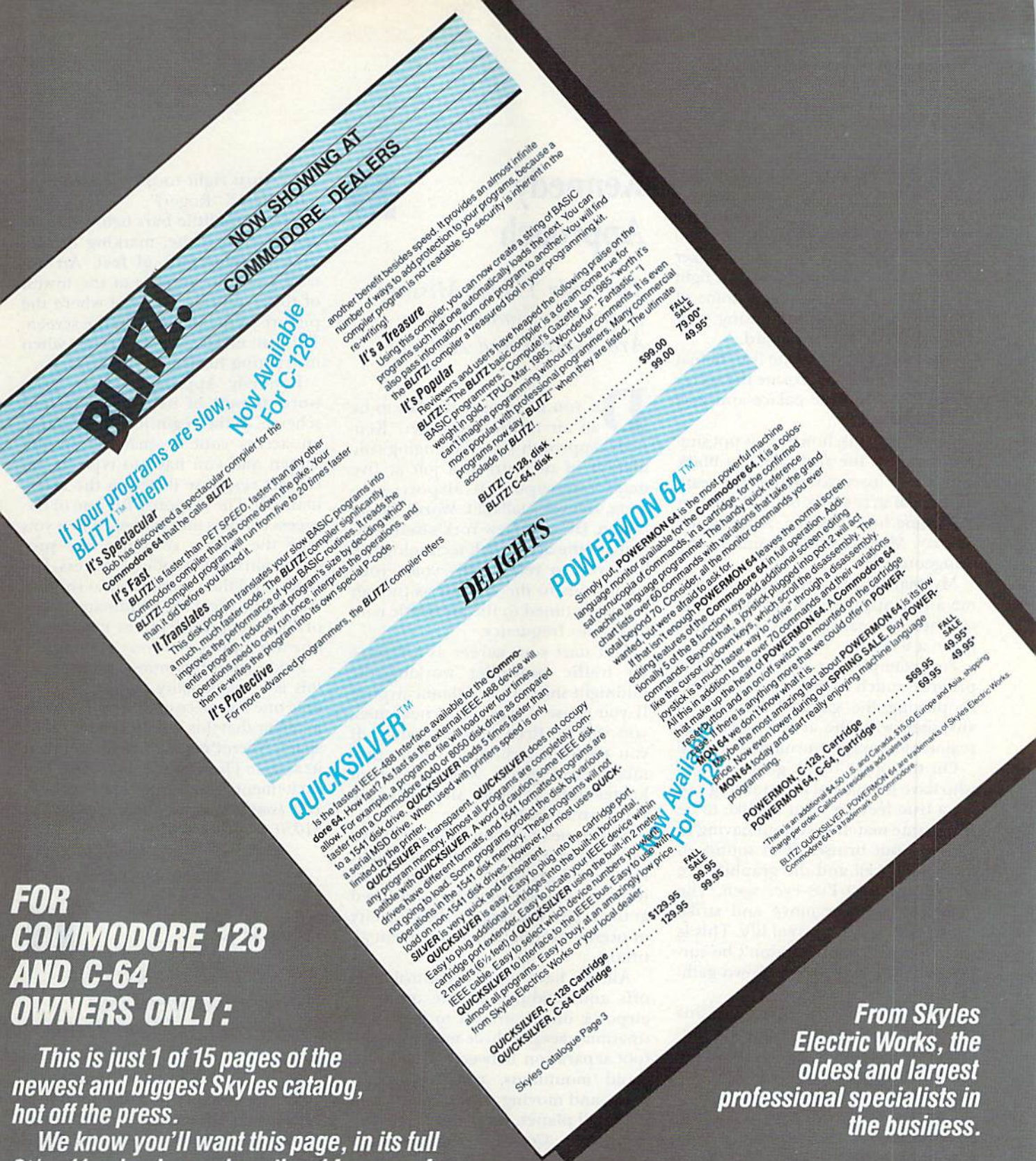
Karateka is a Japanese word that means "one who does karate." As its name indicates, this game enables you to become a skilled karateka without having to study the martial arts for years and years.

The premise of the game is that after years of karate training abroad, you return home to find that your bride-to-be, Princess Mariko, has been kidnapped by an evil warlord who has imprisoned her in his fortress.

In order to save Mariko, you must move forward toward the palace gate. As you approach the palace, one of the guards runs toward you, determined to prevent you from reaching your destination.

You control your character's movements with a joystick or the keyboard. You can assume either a standing or fighting position.

You must advance through a series of gates and guards to reach Mariko, and you can get to her more quickly by running, which is also when you're most vulnerable. A well-placed blow from one of the guards or a sneak attack by the captor's falcon will destroy you and end the game. You can withstand those blows if you advance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while in a fighting stance, but then your progress is very slow.

Throughout your quest, you can absorb only so many blows before you are destroyed and you grow weaker with each palace guard that you fight off. You do, however, regain some of your strength by resting during your fights or by defeating a guard.

The object of the game is to defeat all of the guards, overcome the secret obstacles within the palace and save Mariko.

Achieving this, however, is not simple. I am, in the real world, a black belt karate insructor with eight years of martial arts study behind me, yet this game humbled me. After hours of play, Mariko still remains in the dungeon.

My martial arts training did give me a real appreciation of the subtle touches of realism that make this game a winner.

For example, the on-screen fights progress much as they do in real life. In playing the game, I became as absorbed with the action as I do in real-world karate tournament fights.

On the other hand, game players who have no martial arts training can get a true feel for what it's like to be in a karate match—without having to worry about bruises. The sound effects work well and the graphics are among the best I've ever seen. The on-screen fighters move and strike just as they would in real life. This is a one-player game, but don't be surprised if you find that a crowd gathers each time you play.

The efforts of the creators of this program have produced a truly outstanding computer game. My only criticism is that once your on-screen hero is defeated, the program goes through a somewhat slow reloading process before you can begin play again. Also, there's no provision to pick up where you left off.

But that's nit-picking. Broderbund has produced an absolutely wonderful program that action fans should love. Karateka strikes a blow for Broderbund and serious C-64 gamers everywhere. *(Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. C-64/$29.95 disk.)*

Scott Wasser
Shavertown, PA

Kennedy Approach

A

The Only Things Missing From this Simulation Are Aspirin and Antacid

Do you have what it takes to be an air traffic controller? Kennedy Approach is a challenging simulation of that stressful job at five major metropolitan airports—Atlanta, Denver, Dallas/Ft. Worth, Washington, DC, and New York's Kennedy. State-of-the-art speech technology allows you to realistically voice your commands to the aircraft as though you were tuned to the air traffic control radio frequency.

You start your career as a trainee air traffic controller working the midnight shift at the Atlanta airport. If you cause a crash or a near-miss, you will be fired (end of game). If you perform well, you will be promoted and given your choice of longer shifts at busier airports to advance your career.

Your zone of responsibility is shown as a map marked with airports, flight routes and geographic features. The itinerary of each aircraft is displayed at the top of the screen, showing city of origin, destination and current altitude.

All you have to do is control takeoffs and landings at one or more airports; direct aircraft to their destinations; keep a three-mile or 1000-foot separation between all aircraft; avoid mountains, restricted flight zones and moving storm fronts; handle small planes, jet airliners and the supersonic Concord; and conduct emergency landings when aircraft run low on fuel because of delays.

Piece of cake, right? At advanced skill levels, there will be a relentless flow of up to 26 aircraft on the screen at a time. Luckily, you can pause the simulation at any point in the game.

You use the joystick to set the plane's heading and altitude, then press the fire-button. Your command and the pilot's reply are heard through your TV or monitor: "Delta 4-1-1; turn right to 2-7-0, descend to 4,000 feet." "Roger!"

There are little bars below the image of each plane, marking its altitude in thousands of feet. An aircraft's true location is at the lowest of these altitude bars, *not* where the picture of the plane is on the screen. This can make a big difference when instructing turns and landings.

Kennedy Approach uses a password as part of its copy-protection scheme. At the beginning of the game an access code is printed on the screen and you have to type in the correct response (listed in the user's manual). The response for one of the access codes is misprinted. When you type the wrong response, the program abruptly replies, "Access Denied," and then loads a demo routine from disk. I feel the legitimate owner of the program deserves more than one attempt at a correct response.

Aside from this minor annoyance, this is a high-quality package. I have only one last piece of advice: Try to remember that this is only a game. Once again, MicroProse has really fulfilled its slogan: The action is simulated. The excitement is real! *(MicroProse Software, 120 Lakefront Drive, Hunt Valley, MD 21030. C-64/$34.95 disk.)*

Garold Stone
Annapolis Junction, MD

Mach 5

B

A Disk Utility that Will Increase the Speed and Productivity of Your Drive

The Mach 5 enhancement package consists of a fast-load cartridge, a disk that contains additional enhancement programs and a complete documentation booklet. Included on the disk is Disk Organizer, which permits easy cataloging of disk libraries, and Basic Plus 4K, which is a program that adds 4K of additional RAM to your Basic work space.

The Mach 5 cartridge loads disk-based programs up to five times faster than normal. A 20K program that would take 52 seconds to load with the 1541 disk drive takes only 16 seconds with Mach 5.

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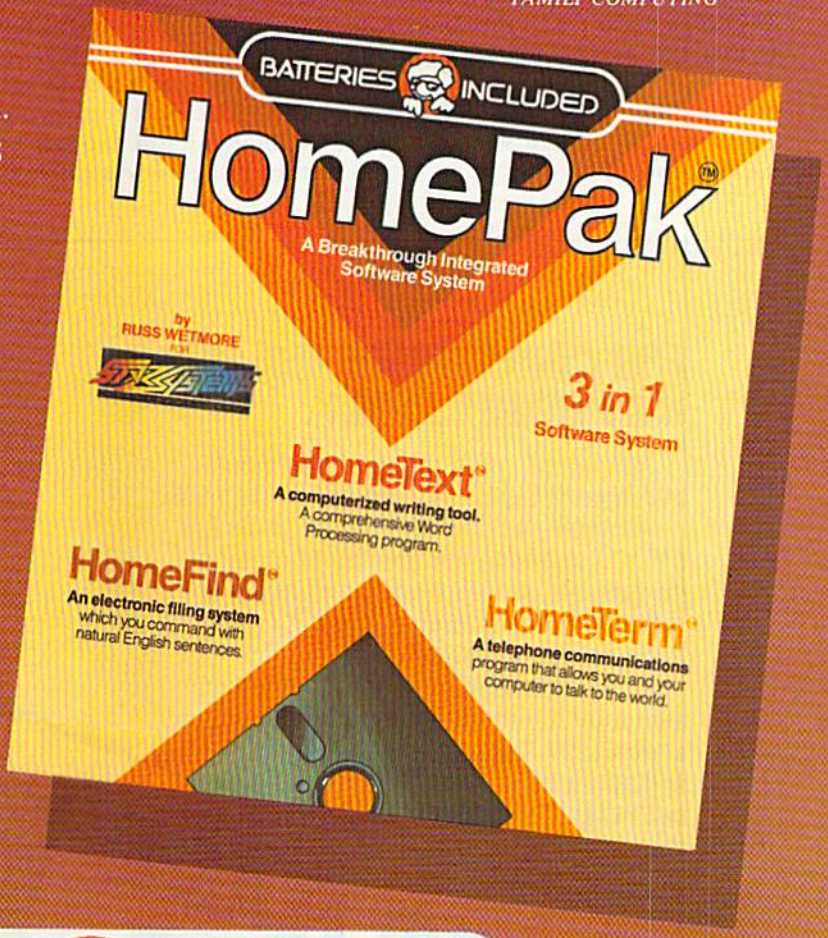
- **all key commands are immediately available on the screen menu; additional commands can be called up for the more experienced user**
- **to help you, system status is displayed right on the screen**

And it's easy to use the three programs together. For example, in the "Merge" mode, you can take data stored in HOMEFIND and print letters and labels using **HOMETEXT**. Or, use **HOMETEXT** to write reports based on information you've called up via **HOMETERM**.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The features of the cartridge are completely transparent and I have not yet encountered any programs that will not load with the cartridge in place. If you do run into problems with Mach 5 in use, you can easily disable the cartridge.

The cartridge also offers a number of other features, each available from simple display menus. There are several commands for loading and saving files in various modes using standard Commodore wild-card syntax. There's also a command that disables the disk drive rattle that normally occurs when the drive is loading copy-protected programs.

Mach 5 is compatible with most popular printers, but it will not work on the Commodore 128 or the new 1571 disk drive. One other drawback is that the program does not offer access to the disk-error channel so that you can check the disk status. Otherwise, this is an excellent and versatile utility.

Disk Organizer is a disk-cataloging program that uses either one or two disk drives and provides a variety of ways to display or print out information about your cataloged disks. It keeps track of the various filenames, which disks they are located on, their size and type and starting tracks and sectors.

After you catalog each disk, you must return to the main menu before you can add your next directory, and there is no indication about what disk you've inserted unless it is already in the master directory. If it does already exist, it cannot be recataloged unless you first delete it from the master directory.

Disk Organizer offers features that are similar to many other commercial disk-cataloging utilities, although the program does have its own advantages and disadvantages. It seems to handle most copy-protected disks, although it did hang up on me a few times when I was cataloging certain disks. Sort times can be slow, but search times are extremely fast.

The Basic Plus 4K utility makes another 4096 bytes of memory available for Basic programming and is completely compatible with all standard Commodore Basic commands. However, it will not work with any program that utilizes the Basic ROM in any way (for example, Peeks, Pokes and SYS calls), nor will it work with most compiled Basic programs. In effect, the Basic ROM is disabled and its code is relocated to free up the additional programming space.

Overall, this is a very useful and powerful utility package. The significant decrease in disk-loading time makes the package well worth the price, and the additional utilities that are on disk provide an added bonus. *(Access Software, 925 East 900 South, Salt Lake City, UT 84105. C-64/$34.95 cartridge and disk.)*

Robert Baker
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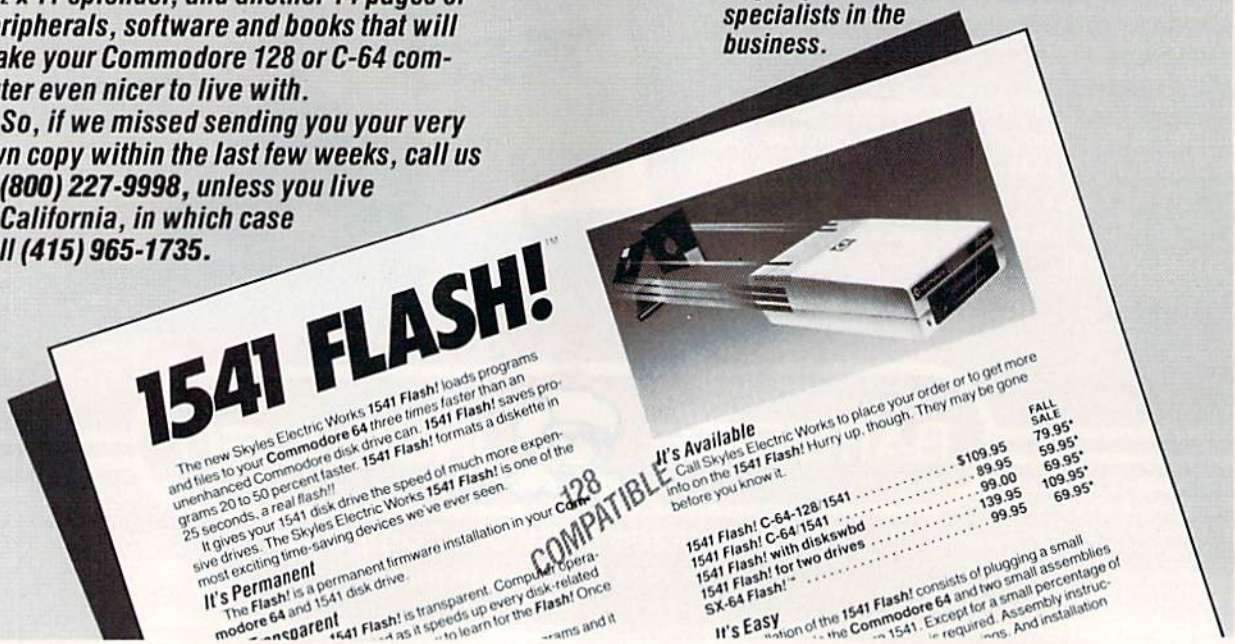
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Graphics Display System

Finally, a hi-res drawing program that lets you print out your creations. And for those of you with disks full of Koala pictures, this program will print those, too.

By YUKIO TEZUKA

Graphics programs are wonderful, but many of them don't enable you to make hard copies of your creations. A drawing program without a save/load/print function is like a space shuttle without mission specialists. You spend a great deal of time to get there, but have nothing to show for it when you return.

Through a lot of trial and error and reading, I developed a high-resolution graphics program that lets you draw with a joystick, then save and load and print out your drawings. The program also lets you make hard copies of pictures from the KoalaPad graphics program.

For those of you not interested in using the Koala pictures, you can use this program alone—as a hi-res drawing program with a Print feature. (In this case, ignore Listing 3.) To use this program without the Koala program, see Table 1 for loading instructions. To use the program with the Koala program, see Table 2 for loading instructions.

This article presents my program, Graphics Display System (GRADS), and discusses its structure, how it works and its capabilities. Understanding the program's logic will help you understand how the C-64 interacts with the 1541 disk drive, the 1525 printer and the KoalaPad to save, load and print bit-map graphics.

RUN It Right

C-64; C-128 (in C-64 mode)
Joystick; disk drive; printer optional

The first section of this article explains the structure of GRADS, the joystick drawing subroutine and smaller subroutines that are necessary to the functioning of the program. The second section explains the Save/Load and Print subroutines for the 1541 disk drive and 1525 printer. The third section presents the main program of the GRADS. The fourth, and final, section explains a special modification of the Print subroutine for the KoalaPad pictures.

The Structure

GRADS is made up of seven subroutines. The Menu subroutine is the only one written in Basic, so you can easily modify it, if you so desire. From the Menu, you can access the program's various subroutines, including one for instructions.

The Mode Change subroutine is the foundation of the GRADS program. The subroutine changes the normal, or character text, screen to the bit-map screen and vice versa. As explained in the *Commodore 64 Programmer's Reference Guide*, it is the Bit-map mode that allows you to produce high-resolution graphics by "assigning each dot or pixel of resolution to its own bit memory location. The bit memory locations can then be signaled ON or OFF. When the bit is ON, the dot assigned to it is also ON." This means that the Bit-map mode lets you control each dot of the entire screen, thereby enabling you to create patterns with the dots.

The Screen Cleaning subroutine allows you to clean up the screen before you start drawing. Cleaning the screen is very important because, when you switch to the High-resolution mode, the screen is filled with "garbage" generated by data currently being stored in memory for the computer's use.

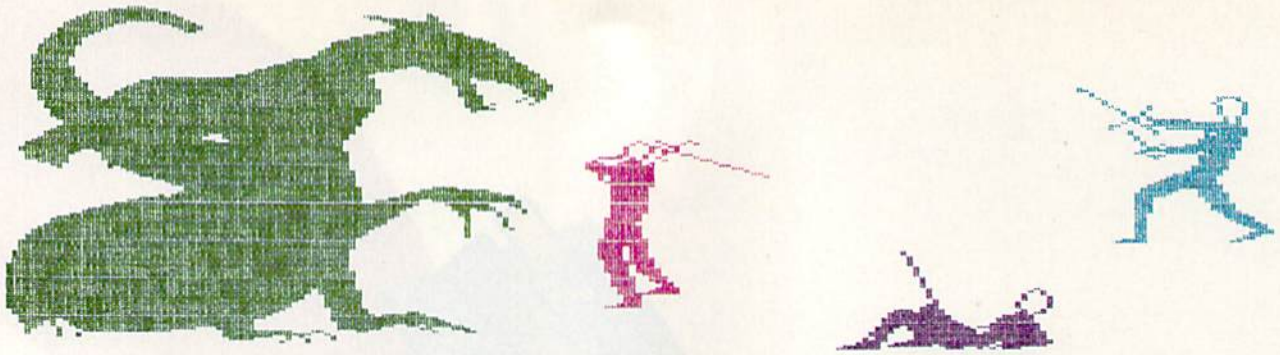
In the Character Text mode, cleaning the screen is usually done by pressing the CLR key. In the Bit-map mode, however, the following short subroutine must be used instead:

```
FOR I = 0 TO 7999:POKE BASE + I,0:NEXT
```

where BASE is the starting memory location of bit-map screen, which will be 8192 in decimal, $2000 in hexadecimal. This Basic subroutine was converted to an assembly subroutine, listed in the program. It can be executed in less than a second.

The Coloring subroutine allows you to choose for the screen display one of the C-64's 256 color

PHIL GERACI



combinations. This is accomplished in Basic as follows:

```
FOR I = 0 TO 999:POKE 1024 + I,
COLOR:NEXT
```

where COLOR is the code of color combination. The subroutine is contained in Listing 1.

Since the screen colors (line and background) are not so important for the mono-color display of the high-resolution bit-map screen, you cannot change them from the menu, but you may change them by modifying line 4 in the main program. The screen colors have, as explained in the reference guide, 256 possible choices (see Table 3).

The combination used in GRADS is a white background with a black pen line. This requires the code value of 1. If you prefer a blue line with a yellow background, you must change the code value to 103. To do this, you must modify line 4 to POKE 49153, 103. To determine the code value of various combinations, see the examples in Table 3.

The Joystick Drawing subroutine essentially allows the joystick to become a graphics plotter. This is accomplished by using the movement of the joystick to signal the bit-map memory of the location indicated. As explained in the reference guide, the signal sent is just a simple on/off code, where 1 indicates on and 0 indicates off.

When the screen is in the Bit-map mode, each bit memory location has a dot associated with it. When the bit is on, a dot will appear at that location on the screen. Therefore, if the joystick is moved to the right, the bit will be signaled on, and a dot will appear on the screen directly to the right of the initial dot. If this process were to continue, there would be a series of horizontal dots, appearing as a line.

Save, Load and Print Subroutines

The program's utility subroutines were developed to let you save and load your graphics data and to make a hard copy of your graphics.

The Save/Load subroutine allows you to save and load the graphics data (8000 bytes) through the 1541 disk drive. Unfortunately, there isn't any Basic command to save or load specific graphics data, except by complicated data filing. However, in assembly language, there is a relatively easy way to do this kind of subroutine using the Kernal.

The Kernal is the C-64's operating system. It controls all input, output and memory management. If you have the reference guide, please refer to it, because understanding and using the Kernal, like other aspects of machine language, takes a little bit of practice and persistence.

When you would like to save or load graphics data, you must specify a filename (or screen name, in this program). You can create a name up to 18 characters long. Corrections can be made with the delete key. When you finish typing your screen name, hit the return key, and the program will save or load your graphics data. Note that saving or loading will also start when you type more than 18 characters.

The Print subroutine allows you to produce a hard copy of your graphics using the 1525 printer. The main difficulty of this subroutine is the conversion of graphics data from the screen format to the printer format; the screen and printer have completely different operational systems. The C-64's screen uses eight dots (eight bits of a byte) to plot. On the other hand, the inexpensive 1525 printer uses seven dots to plot. (Please refer to the reference guide and the printer manual.) This is a serious problem.

To convert from screen to printer format, the X-Y coordinates are used in the same manner as in the Drawing subroutine. Each of the seven dots is examined, summed up in the printer format and then sent to the printer.

The assembly Print subroutine for GRADS takes only about four minutes. This is the quickest that the 1525 can make a hard copy of an entire screen. The Graphics mode in the 1525 printer requires slower operation than the ASCII mode. Program execution time, which doesn't include printing time, is about 30 seconds.

The Main Program of GRADS

GRADS' main task is to provide access to subroutines. To understand this program, you must look at its main structure (see Listing 2). GRADS is framed by the menu, from which you can access seven functions by Goto statements. The subroutines in them will be activated by a SYS statement. After execution, you will return to the menu, either automatically or manually.

Before execution, however, you must input some data. This includes the X-Y coordinates, where the drawing starts, and the speed of dot movement. The Data statements for the assembly subroutines are in Listing 1, SRT/DATA. Be careful when entering Listing 1; otherwise, you end up disabling the program and, frequently, the C-64 itself.

These two separate programs must be loaded to use GRADS. Have your joystick in port 1 and load and run the SRT/DATA program (Listing 1). Then type NEW and hit the return key. This is necessary to get back from outside the Basic area. Next, load the main GRADS program (Listing 2) and run it. If you've done everything correctly, it should work. Just follow the menu and the screen prompts, and you're on your way.

I should mention a few tricks in this program. After entering the menu, press B for the existing screen. This will let you observe how the garbage of initial memory is laid out in the bit map. Hit M to go back to the menu. Then hit N for new screen or to erase the garbage.

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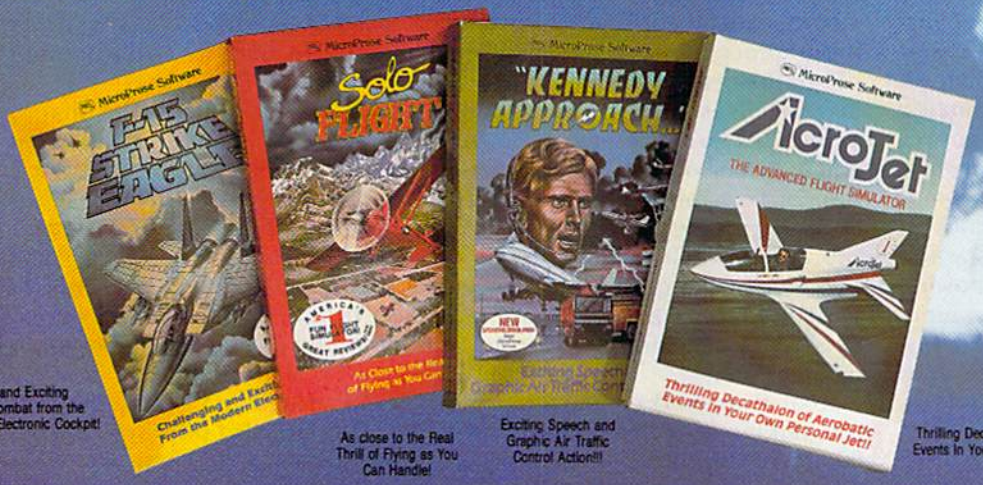

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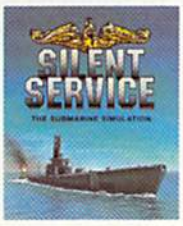

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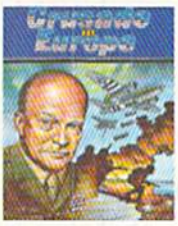

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1. LOAD "SRT/DATA",8
2. RUN
3. NEW
4. LOAD "GRADS",8
5. RUN

Table 1. *Instructions for starting the GRADS program.*

1. LOAD "SRT/DATA",8
2. RUN
3. NEW
4. LOAD "FT/DATA",8
5. RUN
6. NEW
7. LOAD "{RVS/shifted A} PIC X FILE-NAME",8,1
   (The filename must be 8 characters long. Insert extra spaces if needed.)
8. NEW
9. LOAD "GRADS/FT",8
10. RUN

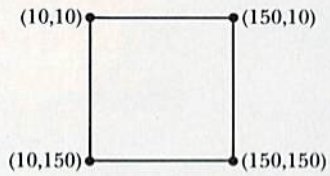
Table 2. *To start the GRADS program for use with Koala pictures.*

Color Code	Color	Value for Poking
0	Black	= (color code for line)*16
1	White	+ (color code for screen)
2	Red	
3	Cyan	Examples:
4	Purple	Black (0) line with white (1) screen
5	Green	Value = 0*16+1 = 1
6	Blue	POKE 49153, 1
7	Yellow	Blue (6) line with yellow (7) screen
8	Brown	Value = 6*16+7 = 103
9	Orange	POKE 49153, 103
10	Light Red	
11	Grey 1	
12	Grey 2	
13	Light Green	
14	Light Blue	
15	Grey 3	

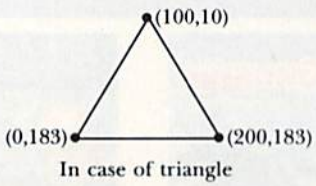
Table 3. *Color chart for changing line and background colors.*

While you are drawing, you may occasionally need to place a point in a geometrical form. Instead of maneuvering your joystick, it is easier to use X-Y coordinates. You can do this by resetting the X-Y coordinates.

Hit N for a new screen, but answer "No" to the question, "Do you want to erase the screen?" Another prompt then appears: "Enter X-Y coordinates." Now you can reset the starting location of the drawing. By following this procedure, you can set any number of points in particular locations, and, later, using a joystick, draw lines to connect them. Examples:



In case of square



In case of triangle

Using Koala Paint

About two years ago, the KoalaPad was introduced. It is much easier to use than a joystick or light pen, and much better for creating detailed graphics.

It is a great device, similar to the Lisa or Macintosh in that it provides a more artistic approach to producing graphics. However, its KoalaPaint program doesn't have any Print command. This is quite understandable, as there are so many types of printers and plotters on the market that a standard operational printer doesn't exist. Fortunately for us, the Print subroutine in GRADS can be modified for Koala's graphics. To make a hard copy of a Koala picture, you need only one additional subroutine, named Filter.

KoalaPaint works in the multicolor Bit-map mode, which creates 160- × 200-pixel resolution. Eight horizontal dots are controlled by four pairs of two bits. These four pairs are then controlled by color registers (please refer to the reference guide).

The concept behind the Filter subroutine is this: When dots are colored by register 1 or 2, or by the text color register, they will be treated as monocolored dots. When this happens, it's like watching a colored scene on a black and white TV. The data program for the Filter subroutine is in Listing 3 (FT/DATA).

Before modifying the main program, you should also know that the Koala graphics data is stored from memory location $6000 (24576) to $7F3F (32575). This implies that the KoalaPaint program displays a graphics character at the $2000 area (8192–16191), while it temporarily stores the graphics data at the $6000 area to allow for user's mistakes.

On the other hand, the GRADS stores and also displays the graphics data at the $2000 area. Therefore, if you want a Koala picture to be displayed on the screen, you have to transfer its data from the $6000 area to the $2000 area by entering:

```
FOR I=0TO7999: POKE 8192+I,
PEEK(24576+I): NEXT
```

However, this one-line program takes a couple of minutes to execute.

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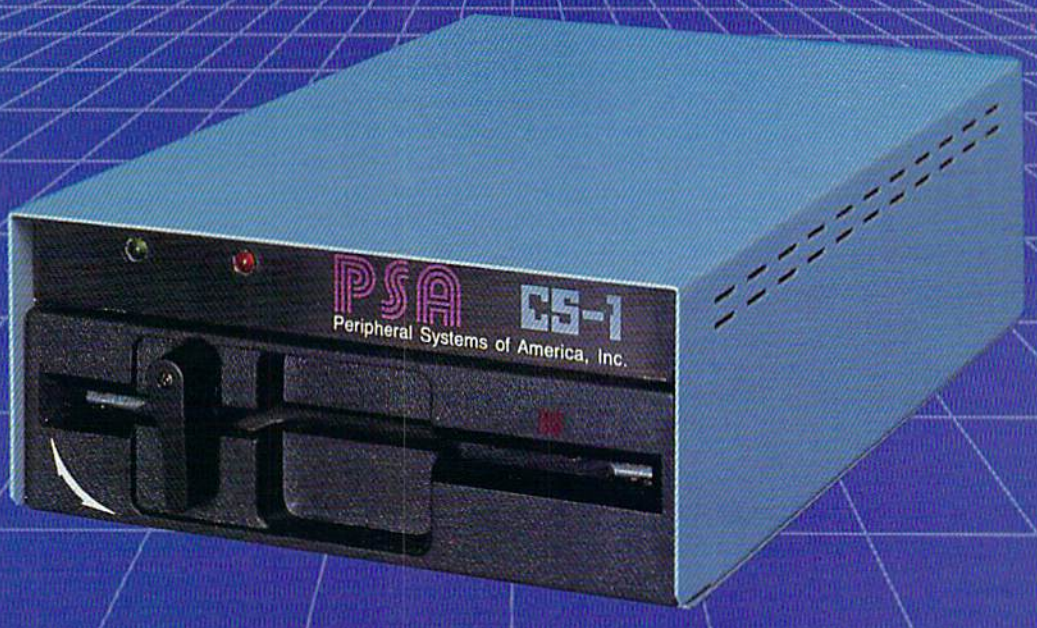

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Next, you should change and add the following lines in the main program. Then save the revised program as "GRADS/FT" for future use whenever you want to load Koala pictures.

```
609 PRINT" * {5 SPACES} F—FILTERING
    KOALA PICTURE"
629 IFT$ = "F"THEN900
630 GOTO621
900 PRINT"{SHFT CLR}"SPC(82)"MAKE
    SURE EVERYTHING IS READY"
901 PRINT" {2 SPACES} FOR FILTERING
    KOALA PICTURE."
910 PRINT" {2 SPACES} IF READY, HIT
    RETURN."
920 PRINT" {2 SPACES} 'M' FOR MENU."
930 GETT$:IFT$ = ""THEN930
940 IFT$ = "M"THEN600
950 IFASC(T$) = 13THEN970
960 GOTO930
970 SYS 50208
980 PRINT"{SHFT CLR}"SPC(82)"DO YOU
    WANT A SCREEN DISPLAY?"
990 GETT$:IFT$ = ""THEN990
991 IFT$ = "Y"THEN994
992 IFT$ = "N"THEN600
993 GOTO990
994 SYS 50320
995 GOTO600
```

The process to load a Koala picture is listed in Table 2. After you have followed the instructions in Table 2, you will proceed as follows:

1. Choose F for filtering a Koala picture
2. Hit Return to activate it (follow the screen instruction)
3. If you want a screen display, answer YES
4. Choose B for the screen display or choose P for a hard copy

If you are already in GRADS and want to load a Koala picture, hit E to get out of GRADS. Type in: LOAD "(reversed/shifted A)PIC X FILE NAME",8,1 and then RUN. It is tricky to type in a Koala filename. Filenames must be eight characters long; if necessary, insert spaces to bring the filename to this total. It is also tricky to get a reversed/shifted A. Follow the process below.

1. Type in LOAD""
2. Erase the second quotation mark with the delete key.
3. Depress control-RVS ON.
4. Type in a shifted A (Capital A) then control-RVS OFF.
5. Type in PIC x filename",8,1 where x is one of abc... Press the return key.
6. After it has loaded, type RUN to reenter the GRADS program.

Certain Koala pictures will be printed out all in black by the Filter subroutine. The reason is that the printer can only produce pictures in two colors—black and white. Therefore, whatever color you chose for the initial background of your Koala picture will be white (unprinted paper) on the hard copy. All other colors will be black.

However, when you change the background color by painting a different color over the initial background color, it will be considered black. For example, in the KoalaPaint program,

load a Koala picture, such as pic d farm. You will see what happens.

If you're using a television as a monitor, you'll notice a marked difference between the graphics display on your screen and the graphics produced on your printer. The television screen and printer have different configurations of dots. The printer has almost square dots; the TV screen has rectangular dots.

To adjust this difference, you can either adjust the vertical control in your TV or, before you begin drawing on the screen, prepare a graphics character extended in the vertical dimension.

You may discover some unexpected graphics patterns at the bottom of your hard copy. This is due to the garbage stored at the memory location after 8192 + 7999. Actually, the printer prints out more than an entire screen. To avoid this problem, add the following at line 5:

```
5 FORI = 0TO319: POKE 8192 + 8000 + I, 0:
  NEXT
```

Enjoy drawing with your joystick and KoalaPad. R

Address all author correspondence to Yukio Tezuka, 275 Bryn Mawr Ave., H-49, Bryn Mawr, PA 19010.

Listing 1. *SRT/DATA program.*

```
997 REM "+++ SRT/DATA - SUBROUTINE MACHINE
    CODES +++"                          :REM*174
998 FORI=ØTO893:READA:POKE49174+I,A:NEXT
                                        :REM*171
1ØØØ DATA169,Ø,141,18,192,173,Ø,192,141,19,
     192,16Ø,Ø,173,18,192,133,251,173,19
                                        :REM*239
1Ø1Ø DATA192,133,252,169,Ø,145,251,238,18,1
     92,2Ø8,3,238,19,192,173,18,192:REM*185
1Ø2Ø DATA2Ø1,64,2Ø8,225,173,Ø,192,24,1Ø5,31
     ,2Ø5,19,192,2Ø8,214,96,169,Ø  :REM*2Ø7
1Ø3Ø DATA141,18,192,169,4,141,19,192,16Ø,Ø,
     173,18,192,133,251,173,19,192   :REM*Ø
1Ø4Ø DATA133,252,173,1,192,145,251,238,18,1
     92,2Ø8,3,238,19,192,173,18,192,2Ø1
                                        :REM*84
1Ø5Ø DATA232,2Ø8,224,173,19,192,2Ø1,7,2Ø8,2
     17,96,173,24,2Ø8,9,8,141        :REM*234
1Ø6Ø DATA24,2Ø8,173,17,2Ø8,9,32,141,17,2Ø8,
     96,173,24,2Ø8,41,247,141,24     :REM*16Ø
1Ø7Ø DATA2Ø8,173,17,2Ø8,41,223,141,17,2Ø8,9
     6,169,Ø,141,21,192,141,11       :REM*14Ø
1Ø8Ø DATA192,32,228,255,2Ø1,77,2Ø8,6,169,1,
     141,2Ø,192,96,173,1,22Ø,74,144,28
                                        :REM*126
1Ø9Ø DATA74,144,43,74,144,6Ø,74,144,98,74,1
     44,8,169,Ø,141,17,192,76,77     :REM*138
11ØØ DATA193,169,1,141,17,192,76,77,193,168
     ,173,16,192,2Ø8,5,169,2ØØ,141   :REM*34
111Ø DATA16,192,2Ø6,16,192,152,76,187,192,1
     68,173,16,192,2Ø1               :REM*52
112Ø DATA199,2Ø8,5,169,255,141,16,192,238,1
     6,192,152,76,19Ø,192,168,173,15,192
                                     :REM*1Ø4
113Ø DATA24Ø,16,173,14,192,2Ø8,5,169,Ø,141,
     15,192,2Ø6,14,192,76,34,193     :REM*2Ø6
114Ø DATA173,14,192,2Ø8,245,169,63,141,14,1
     92,169,1,141,15,192,152,76      :REM*184
115Ø DATA193,192,168,173,15,192,24Ø,21,238,
     14,192,173,14,192,2Ø1,64,2Ø8,19 :REM*4
116Ø DATA169,Ø,141,14,192,141,15,192,76,73,
     193                             :REM*19Ø
12ØØ DATA238,14,192,2Ø8,3,238,15,192,152,76
     ,196,192,169,248,45,14,192,141,2,192
                                     :REM*48
121Ø DATA173,15,192,24,1Ø9,Ø,192,141,3,192,
     169,7,45,16,192,24,1Ø9,2,192    :REM*188
122Ø DATA141,2,192,169,Ø,141,19,192,16Ø,3,1
     62,5,169,248,45,16,192,141,18    :REM*4
123Ø DATA192,14,19,192,24,14,18,192,144,3,2
     38,19,192,136                   :REM*228
124Ø DATA2Ø8,25,173,18,192,24,1Ø9,2,192,141
     ,2,192,144,3,238,3,192,173,19,192,24
                                     :REM*196
125Ø DATA1Ø9,3,192,141,3,192,2Ø2,2Ø8,213,17
     3,18,192,24,1Ø9,2,192,141,2     :REM*16Ø
126Ø DATA192,144,3,238,3,192,173,19,192,24,
     1Ø9,3,192,141,3,192,173,21,192:REM*216
```


Continued on p. 76.

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By MARK JORDAN

Sprite Artist is a sophisticated artistic tool. With it, you'll be able to design shapes rapidly in one or more colors, invert or reverse your shapes, watch your sprites in motion, maneuver your creations (up to three at a time) on top of, above and below each other to create multiple sprites, erase and redraw your figures, expand them both horizontally and vertically, and, best of all, animate your shapes. And, I'm happy to say, it lets you perform all this at machine language speed.

It's a program well worth your typing time, but please obey the time-honored maxim: Save what you've typed before running it for the first time. It could save you a great deal of retyping.

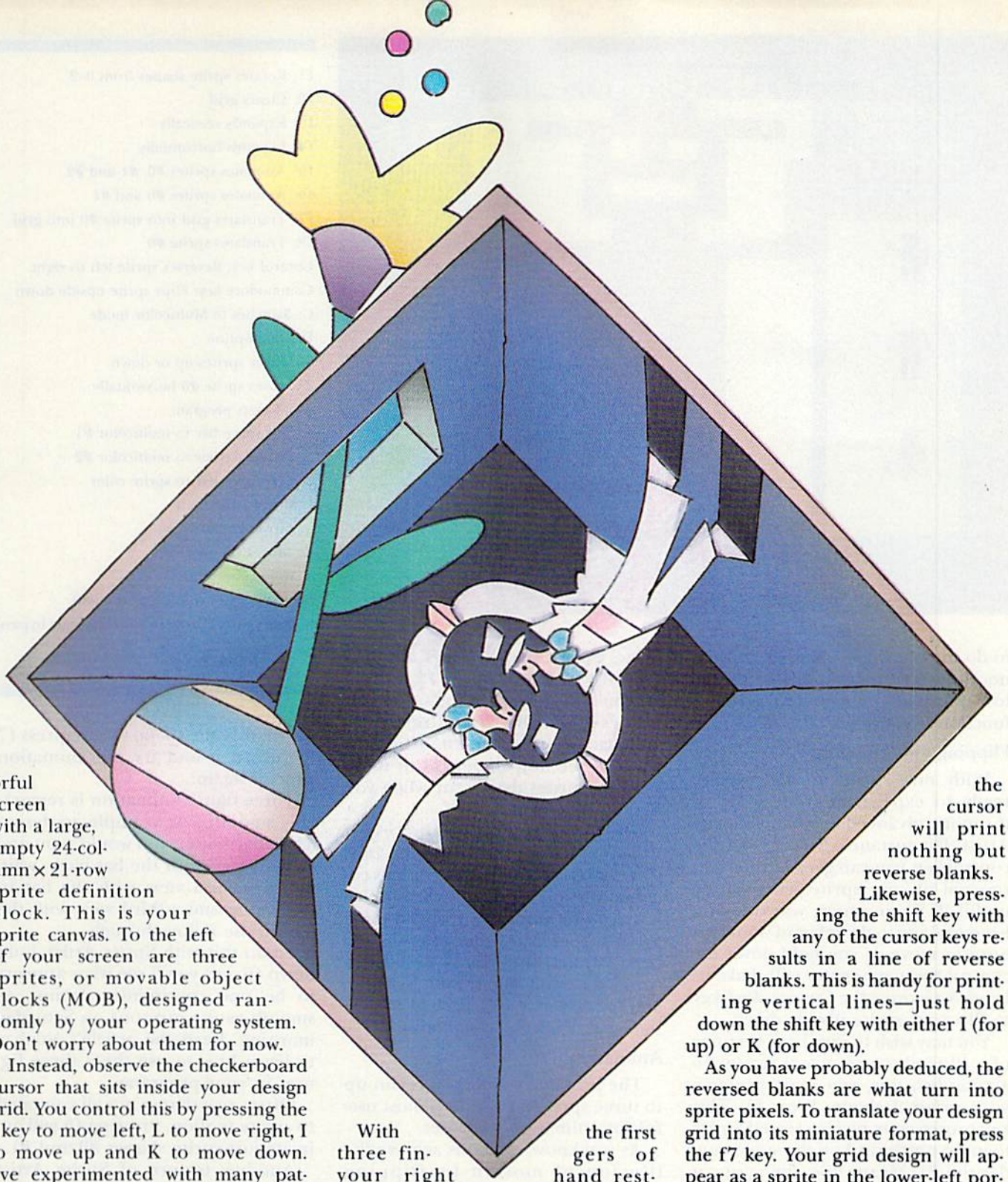
Sprite Artist was designed with on-screen reminders as to which key performs which function. Quite likely, you'll be able to utilize the program without any further instruction. But please read on: The rest of this article will elaborate on those semi-cryptic on-screen memos and help you get full use of Sprite Artist.

The Design Process

When you first run the program, you'll find yourself staring at a col-

RUN It Right

C-64; C-128 (in C-64 mode)



PHIL GERACI

orful screen with a large, empty 24-column × 21-row sprite definition block. This is your sprite canvas. To the left of your screen are three sprites, or movable object blocks (MOB), designed randomly by your operating system. Don't worry about them for now.

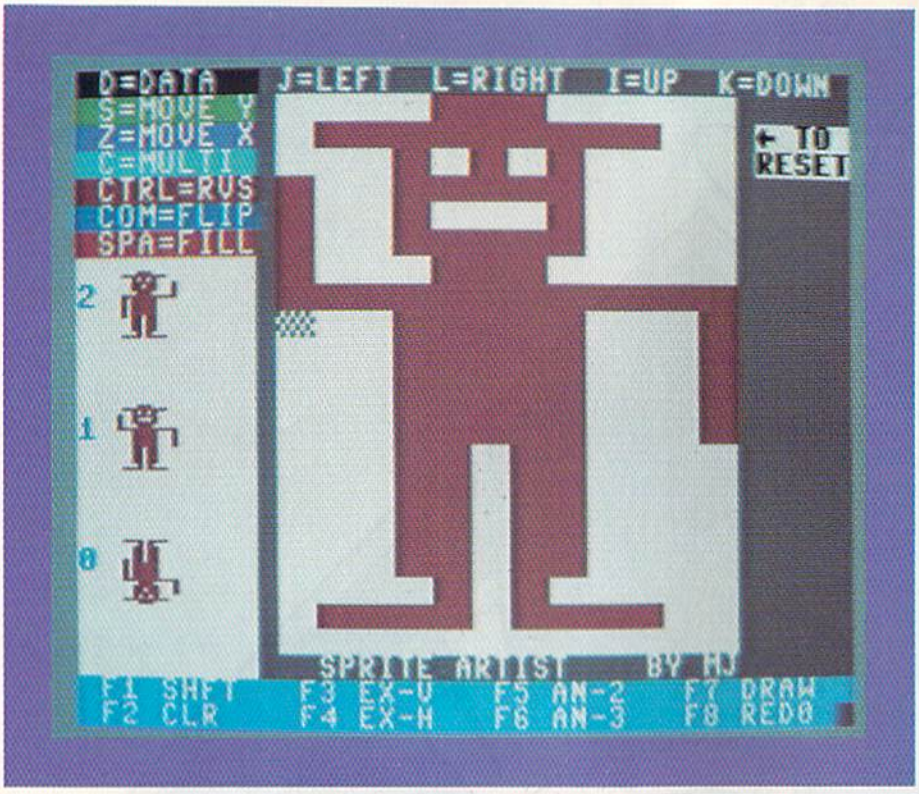
Instead, observe the checkerboard cursor that sits inside your design grid. You control this by pressing the J key to move left, L to move right, I to move up and K to move down. I've experimented with many patterns and have come to agree with the experts that this arrangement is far more convenient than a diamond arrangement. If you don't agree (and you probably won't if you're left-handed), you can easily change the numbers in lines 135–155 to create your own key arrangements.

As you run your cursor to and fro, you'll quickly and happily note that when it reaches the edge of the box, it will wrap around to the other side. You never have to worry about losing your cursor outside the design area.

With the first three fingers of your right hand resting on J, K and L, you'll find your thumb naturally resting on the space bar. Push it once and watch the screen. A reverse blank appears. Hold down the space bar, and the cursor will traverse the screen, leaving a trail of reverse blanks until it has rolled back around to the starting point. Now, as the cursor passes over each reversed blank, it will reverse again. This toggle effect is quite handy, but takes some getting used to. Pressing the shift key with the space bar turns off the toggle, and the cursor will print nothing but reverse blanks. Likewise, pressing the shift key with any of the cursor keys results in a line of reverse blanks. This is handy for printing vertical lines—just hold down the shift key with either I (for up) or K (for down).

As you have probably deduced, the reversed blanks are what turn into sprite pixels. To translate your design grid into its miniature format, press the f7 key. Your grid design will appear as a sprite in the lower-left portion of the screen, just beneath the number 0 located there. Please note that the design grid only affects sprite #0.

As you design your sprite, you'll periodically want to reach over and press f7 to view your ongoing artistry. If you've had experience only with sprite editors that are written entirely in Basic, Sprite Artist will shock you with its instant result. You'll need to hold down the function key for about a quarter of a second, but this is not because it takes the program that long



f1: Rotates sprite shapes from 0–2
f2: Clears grid
f3: Expands vertically
f4: Expands horizontally
f5: Animates sprites #0, #1 and #2
f6: Animates sprites #0 and #1
f7: Translates grid into sprite #0 into grid
f8: Translates sprite #0
Control key: Reverses sprite left to right
Commodore key: Flips sprite upside down
C: Switches to Multicolor mode
D: Data option
S: Moves sprites up or down
Z: Moves sprite #0 horizontally
(←): Resets program
1: Sets space bar to multicolor #1
2: Sets space bar to multicolor #2
3: Sets space bar to sprite color
J: Moves cursor left
L: Moves cursor right
K: Moves cursor down
I: Moves cursor up
Space: Toggles spot on grid on/off
Shifted space: Fills spot on grid (toggle bypass)

Table 1. *Sprite Artist's Options*

to do the translation. Rather, this minor delay was created purposely, to allow many of the other features to function effectively.

Flipping and Flopping

With one sprite created, you're ready to experiment with some of the more advanced features of Sprite Artist. For instance, by pressing the control key, you can get a left-to-right reversal of your sprite. This can be useful if, for instance, you design a head looking to the left and want that head to move. If you hold down the control key, your critter will shake its head. Now press the Commodore key to flip your sprite upside down.

You may wish to save both versions of a flipped (or reversed) sprite. To accomplish this, you must preserve your original shape. Press f1. This key causes your newly created sprite to jump northward on the screen under the #1. Meanwhile, the sprite at #1 (if any) will have jumped to the #2 slot, and sprite #2 will reside in the #0 location. Your design grid will still contain the same design. Press f7 to record it again (now sprite #0 will be the same as sprite #1), followed by the Commodore key to flip it. You now have both versions of your sprite.

As you can see, f7 and f1 are crucial keys in Sprite Artist. So, too, are their shifted counterparts, f2 and f8. The f2 key will clear out your design grid. It is similar to a clear/home in Basic, except that it clears only the grid. If you follow up an f2 with an f7, you'll also clear out the sprite that resides at #0. (Be careful not to accidentally clear sprite #0.) And now you can see how to get rid of those random sprites that occur when you first run the program.

The f8 key reverses the process. It will retranslate whatever shape is at sprite #0 and refill the grid with its enlarged version. This handy feature allows you to modify any of the three sprite shapes at any time after they've been formed. Just press f1 to shift the sprite you want into the #0 location, and press f8 to put it back in the design grid. Then you can modify it.

Animation

The program's ability to retain up to three sprites at a time is most useful for animation purposes.

As you know, cartoons achieve the illusion of motion by flipping through several pictures that have been designed with slight changes. With Sprite Artist, you can design three shapes and "flip" through them by pressing and holding f6 (shifted f5). Your three shapes will sequence in the sprite #0 area.

If the animation is too rough or otherwise undesirable, press f1 until you get the particular sprite you wish to modify into sprite #0 location. Next, press f8 (shifted f7). The design grid will now be lit up with the enlarged version of this sprite. Now simply modify the shape to suit, press f7 to record it and try the animation process again.

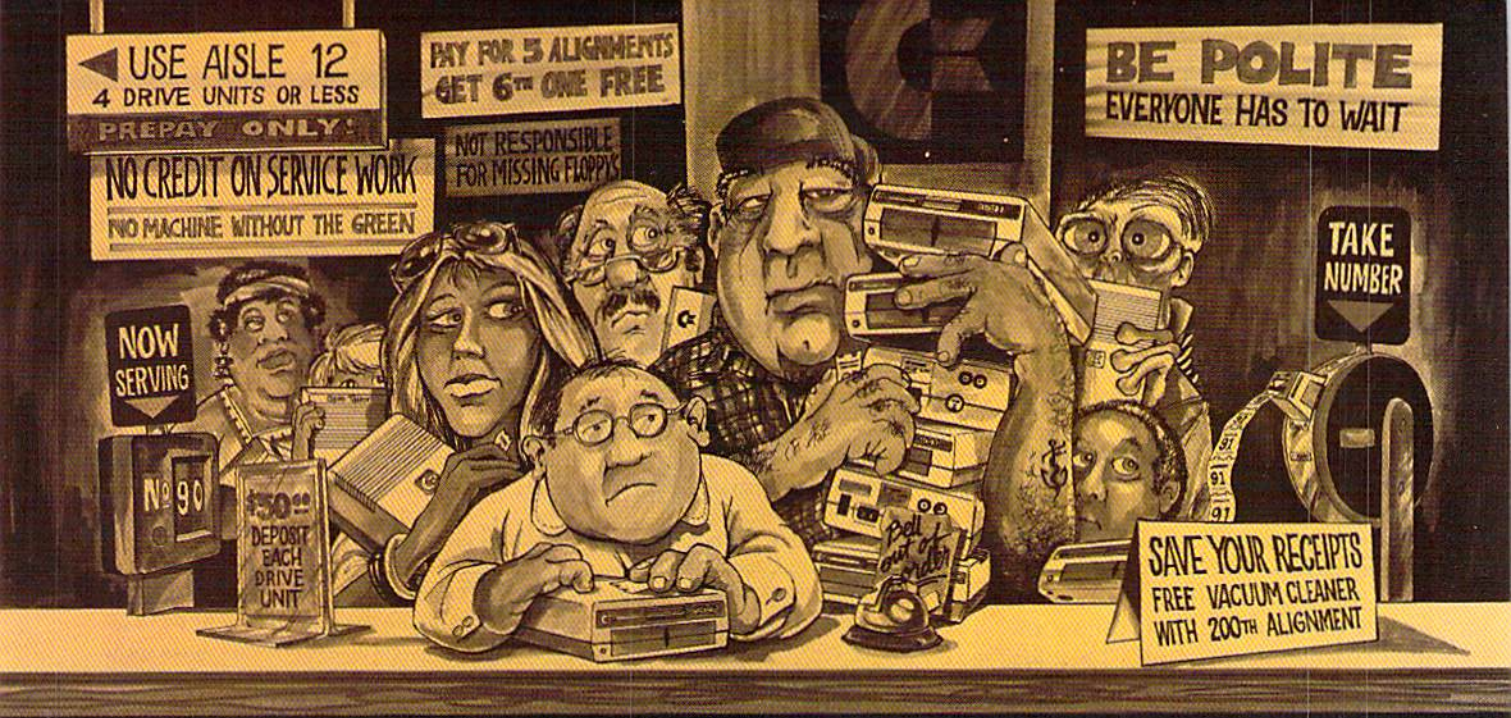
Three-figure animation is remarkably smooth. For example, to design a baseball batter, you would want one view of him with the bat back, waiting, a second view with the bat in mid-swing and a third view with the bat on the follow-through.

To do this with Sprite Artist, hold down f6 and you'll see what appears to be one continuous motion, as smooth as the cartoons on Saturday morning. Read the article's sidebar to learn how to use these three figures in your programs.

Often, two shapes are all you need to create motion. Pressing f5 will animate just sprite shapes #0 and #1.

Another feature of Sprite Artist allows you to view your animated sprite in motion. Press the Z key. This will propel sprite #0 eastward across the screen in a relentless scroll. While it is moving, hold down f5 (or f6) and the animation will occur. Press the return key to exit.

During the move cycle, you can also hold down the control or Commodore keys to get other interesting animated effects. My kids, who have no interest in programming (they're five and seven), enjoy Sprite Artist for this reason alone. They make a



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shape, put it in motion and then animate it. It's fun.

One last note about animation. When you release the f5 key, you may find sprite #0 doesn't reveal the original sprite #0 shape. Simply hold f5 down longer until your original MOB reappears; then let go.

Other Functions and Effects

So far, you know what happens when f1, f2, f5, f6, f7 and f8 are pressed. What about f3 and f4? Try them and see. Pressing f3 expands your sprite vertically; f4 expands it horizontally.

One other key is quite useful for special effects—the S key. When you press it, you can then move your sprites up or down. Just follow the self-explanatory prompts. This feature is highly desirable when you want to create a two- or three-story sprite shape. To me, the C-64's 24-column × 21-row sprite definition block is often just not big enough to create characters with personality. I get around this by making one sprite a head and another a body. I know it's not all that proportional to have head and body of equal size, but it makes for delightful little chaps.

Multicolor

All the above features make Sprite Artist a very valuable tool for the aspiring sprite craftsman—but there is more: multicolor.

To get into the Multicolor mode at any time, just press the C key. You'll then be asked to designate three color-code numbers. The first will become multicolor #1, the second multicolor #2, and the third will become your sprite color number. While you don't need to know this to use it, you'll need to know it if you wish to use the multicolor sprites you've designed with Sprite Artist within your own programs. If you later wish to exit the Multicolor mode, press the back-arrow key (←) to reset.

Designate these colors by typing a number from 0 to 15. These are the same numbers as the color Poke codes; that is, 0 equals black, 1 equals white, 2 equals red, and so on. Refer to your manual to see which color code belongs to which color. If you later don't like your color choices, just reenter the menu by pressing the C key again and enter new choices.

When you exit the menu, you'll discover an important change has occurred. Any sprites you had already designed will now be multicolored and somewhat distorted. Also, your cursor will be two times its previous width (you'll have to move it once to initiate this change).

As you move it, you'll discover it now increments twice the horizontal distance it did before. You'll also discover that, when you press the space bar, a double-width, colored reversed blank appears. The reason the cursor doubles its width is because that's the way Commodore designed the VIC chip to handle color. Obviously, that reduces horizontal resolution by half. What it loses in resolution, it more than makes up for in variety.

You must account for a couple of other factors when you design in Multicolor mode. Most importantly, you must designate what color you want your space bar to impart. To get the three color choices you made in the Menu mode, simply press 1, 2 or 3, and your space bar will impart the corresponding color.

When you want to change colors, just press a different number. The space bar will now yield a reversed blank in that color. However, please note that if you press the space bar over an already-colored reversed blank, it will first toggle, then disappear. The second time you do this, you'll impart the new color; unless you press the shift key along with the space bar (or cursor keys). That, remember, undoes the toggle effect.

Another factor to consider is that the control key (which reverses your sprite) will, unless you design carefully and symmetrically, probably cause the colors to jumble. Flipping and all the animation and motion functions will still work fine, however.

If you've browsed through the *Commodore 64 Programmer's Reference Guide* and never really understood how Multicolor mode works, you can get some idea by pressing the back-arrow key to reset the program. Now your existing multicolored sprites will be revealed in Single-color mode.

Press f8 to retranslate a sprite back into your design grid. You'll discover that all those areas you had colored in color 1 will be translated in such a manner that for each pair of dots, you'll only get a single reverse blank to appear—the left one. Color 2 will have just the right reverse blank on. Only dots colored in color 3 will translate properly into two reverse blanks. Seeing the grid lit up in this way will do a lot for your comprehension of Multicolor mode.

What about the fourth color you read about in the manual? The fourth color is actually whatever color lies beneath your sprite. In other words, the areas of your sprite that you have not colored in are transparent, and the background will show through. You can use this as a design feature,

Spriten Up Your Programs

While Sprite Artist can be used as an end in itself, you'll eventually want to insert your Disneyesque fellows into programs you're writing. Please refer to Listing 2 as you read these instructions.

First, of course, you need to design a sprite using Sprite Artist. Remember, if you want to animate a sprite, you'll need two or three different sprite figures. Preserve the data generated by your sprite(s) by using Sprite Artist's Data option (the D key). You can preserve the data on tape or disk or on paper. Each different sprite shape requires 64 data numbers.

Now type in Listing 2. If you preserved your sprite data on paper, type that in as well, beginning with line number 1000. If your data is already on disk, it will automatically load from this program. Run the program, answer the prompts and, Ta-da! You'll see your sprite appear.

The animation works because the value in memory location 2040 (see line 140) keeps changing. This value is called a pointer because it points the computer to where to look for your sprite data—in this case, it will look to location 12288. Why 12288? Because a 192 is Poked into location 2040, and the computer multiplies that number by 64 to see where exactly the sprite data to be displayed is located. Sprite Artist always stores sprite data beginning at location 12288.

As the pointer changes, so does the sprite shape, resulting in apparent animation.

Lines 10–90 are primarily there as conveniences to prompt your sprite onto the screen. Lines 100 and on are the heart and soul of sprite use.

Lines 120 and 130 are strictly for multicolor sprites. You may omit them if your sprites are single-color. If you do use multicolor sprites, you may change the values in V + 37, V + 38 and V + 39 (line 110) to whatever colors you prefer.

To get further grounding on how to use sprites in your programs, study Listing 2 and compare it to the section on sprites in the *Commodore 64 Programmer's Reference Guide*.

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By Roger and Bruce Carver

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but you'll need to be careful that your sprite doesn't pass over any unwanted background colors.

There is also a way to get better sprite resolution and more colors—overlay sprites. With Sprite Artist, you need design only two shapes, then press the S key and move one on top of the other. Overlay all three for even more variety. The possibilities are limitless.

Saving Your Data

One key's function remains to be discussed. The D key stands for data key. You'll want data in one of three places: on the screen (so you can write down the data to use in a program); on the printer (so it's already written down); or on the tape or disk (tape users should change the 8 in line 340 to a 1). The D key will take you to one of these three ends.

The screen option is simple, self-explanatory (follow the prompts) and limited to one sprite at a time. The printer option works precisely the same way. Please read the sidebar if you're unfamiliar with what to do with all this data.

Saving to disk or tape is handier if you want to skip the data process. Press S when the Save/Load prompt comes up, and your data will be saved memory-specific into locations 12288–12480, which happen to be the standard sprite-memory space.

Since Sprite Artist saves them as a machine language program, they'll load back directly into these registers. With Sprite Artist in your computer, press the L key whenever you want to call up some of your former creations, and your sprites will load quickly. You can now modify them, play with them or whatever. If you wish to resave, just remember to give them a new name.

You can also load your sprites into any program in the same manner. It's easy to do. At the top of your program, include this line:

```
LOAD "my sprites",8,1
```

(Tape users change the 8 to a 1.) Your computer will load this and then begin running the rest of your program.

Another option is simply to load your sprite program first, type NEW, then load your main program. It's necessary to type NEW because, when you load anything on the C-64 into specific memory registers, the pointers get messed up.

A third alternative exists. Load your sprite program (again: LOAD "my sprites",8,1: NEW), then write a routine in the Immediate mode to read the data to the screen, where you can convert it into program data. Here's a simple technique:

```
FORT = 12288 TO 12479 STEP 14:
  FORI = 0 TO 13:
PRINT PEEK (T+I)"[cursor left],":
  NEXT: PRINT: NEXT
```

Now you can insert seven or eight spaces at the beginning of each row of numbers and type a line number, followed by the word DATA and a Return to make it a program line.

A quick-reference menu is included with this article (see Table 1) to help you remember all the options. After you've used the screen several times, it alone will be enough of a reminder.

I hope you have fun with Sprite Artist. Whether you use it to create sprites for machine language, arcade-quality games or simply to manufacture on-screen cartoons, Sprite Artist should make the process pleasant and convenient.

For those of you who don't want to type in this program, send me a blank tape or disk with a self-addressed stamped envelope and $3, and I'll send you a copy. R

Address all author correspondence to Mark Jordan, 70284 C.R. 143, Ligonier, IN 46767.

Listing 1. *Sprite Artist program.*

```
1Ø Q=1:H=1:E=334:POKEE,32:POKEE+1,32:POKEE+
   2,14:CC=54272:M3=14:X=1Ø75:EX=33 :REM*52
15 PRINT"{SHFT CLR}{2 CRSR DNs}","HANG ON F
   OR 7 SECONDS"                    :REM*51
2Ø IFWW=1THEN3Ø                     :REM*124
25 FORT=49152TO49863:READA:POKET,A:NEXT
                                    :REM*253
3Ø V=53248:POKEV+28,Ø:WW=1          :REM*76
35 POKEV,4Ø:POKEV+1,19Ø:POKEV+2,4Ø:POKEV+3,
   15Ø:POKEV+39,M3:POKEV+4Ø,M3      :REM*3
4Ø POKEV+4,4Ø:POKEV+5,11Ø:POKEV+41,M3:POKE2
   Ø42,194                          :REM*116
45 POKE2Ø4Ø,192:POKE2Ø41,193:POKEV+21,15
                                    :REM*129
5Ø SYS 49152:POKE65Ø,128            :REM*132
55 POKE53281,14:PRINT"{SHFT CLR}":POKE53281
   ,1:POKE5328Ø,15                  :REM*121
6Ø PRINT"{HOME}{CTRL 1}{CTRL 9} D=DATA{2 SP
   ACEs}{COMD 5} J=LEFT{2 SPACEs}L=RIGHT{2
   SPACEs}I=UP{2 SPACEs}K=DOWN ";   :REM*168
65 PRINT"{CTRL 9}{CTRL 6} S=MOVE Y":REM*217
7Ø PRINT"{CTRL 9}{CTRL 5} Z=MOVE X":REM*242
75 PRINT"{CTRL 9}{CTRL 4} C=MULTI ":REM*157
8Ø PRINT"{CTRL 9}{CTRL 3} CTRL=RVS"  :REM*2
85 PRINT"{CTRL 9}{CTRL 7} COM=FLIP":REM*161
9Ø PRINT"{CTRL 9}{COMD 1} SPA=FILL{COMD 7}"
                                    :REM*112
95 PRINT"{CRSR DN}2":PRINT"{4 CRSR DNs}1":P
   RINT"{4 CRSR DNs}Ø"              :REM*65
1ØØ PRINT"{4 CRSR DNs}{CTRL 9} F1 SHFT{3 SP
    ACEs}F3 EX-V{3 SPACEs}F5 AN-2{3 SPACEs}
    F7 DRAW{2 SPACEs}";             :REM*158
1Ø5 PRINT"{CTRL 9} F2 CLR{4 SPACEs}F4 EX-H{
    3 SPACEs}F6 AN-3{3 SPACEs}F8 REDØ {COMD
     5}{HOME}{CRSR DN}{CTRL Ø}";:POKE2Ø23,1
    6Ø                              :REM*115
11Ø FORT=1TO21:PRINT,"{CTRL 9}{CRSR LF} ",,
    "{4 CRSR RTs}{6 SPACEs}";:NEXT :REM*2Ø4
115 PRINT,"{CTRL 9}{CRSR LF}{3 SPACEs}SPRIT
    E ARTIST{4 SPACEs}BY MJ{6 SPACEs}{3 CRS
    R UPs}":X=1Ø75                  :REM*2Ø3
12Ø PRINT"{HOME}{2 CRSR DNs}",,,"{5 CRSR RT
    s}{CTRL 1}{LEFT ARROW} TO {CRSR DN}{5 C
    RSR LFs}RESET{COMD 5}"          :REM*1Ø6
125 SR=1Ø24:X=1Ø:Y=1:SC=Y*4Ø+X+SR:POKESC,1Ø
    2:CR=16Ø                        :REM*115
13Ø Z=PEEK(197):ZZ=PEEK(653):ZX=Ø   :REM*23Ø
135 IFZ=34THENGOSUB39Ø               :REM*85
14Ø IFZ=42THENGOSUB4Ø5              :REM*254
145 IFZ=37THENGOSUB42Ø                :REM*5
15Ø IFZ=33THENGOSUB435               :REM*52
155 IFZ=6ØTHENGOSUB51Ø              :REM*171
16Ø IFZ=2ØTHEN36Ø                    :REM*82
165 IFZ=57THEN1Ø                    :REM*171
17Ø IFZ=18THEN26Ø                    :REM*6Ø
175 IFZ=13THEN2Ø5                     :REM*7
18Ø IFZ=12THEN545                   :REM*216
185 IFZ=56THENQ=1                   :REM*1Ø5
19Ø IFZ=59THENQ=2                    :REM*5Ø
195 IFZ=8THENQ=3                    :REM*161
2ØØ GOTO13Ø                         :REM*178
2Ø5 PRINT"{SHFT CLR}{CRSR DN} PRESS NUMBER
    (Ø - 2) OF SPRITE":POKE198,Ø    :REM*2Ø3
21Ø GETA$:IFA$=""THEN21Ø            :REM*182
215 PRINT"{2 CRSR DNs}{CTRL 9} - {CTRL Ø} (
    DOWN), {CTRL 9} + {CTRL Ø} (UP) OR {CTR
    L 9} RETURN {CTRL Ø} TO EXIT{HOME}"
                                    :REM*181
```


Continued on p. 82.

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Sensational Screen Trilogy

With these three programs, you can combine creative designs with serious applications and text. You can also enhance any files you created with GraphMaker 64 (RUN, April 1985).

By DOUG SMOAK

ScreenMaker 64 (Listing 1) is a utility program that allows you to design screens and save them to disk as files that can be reloaded and displayed for many useful purposes.

It features a Large Text mode, which allows you to enter text in large letters, about four or five times their normal character size. More on that later.

Two other programs, ScreenViewer (Listing 2) and ScreenBooter (Listing 3), will allow you to make the best use of all your ScreenMaker 64 screens.

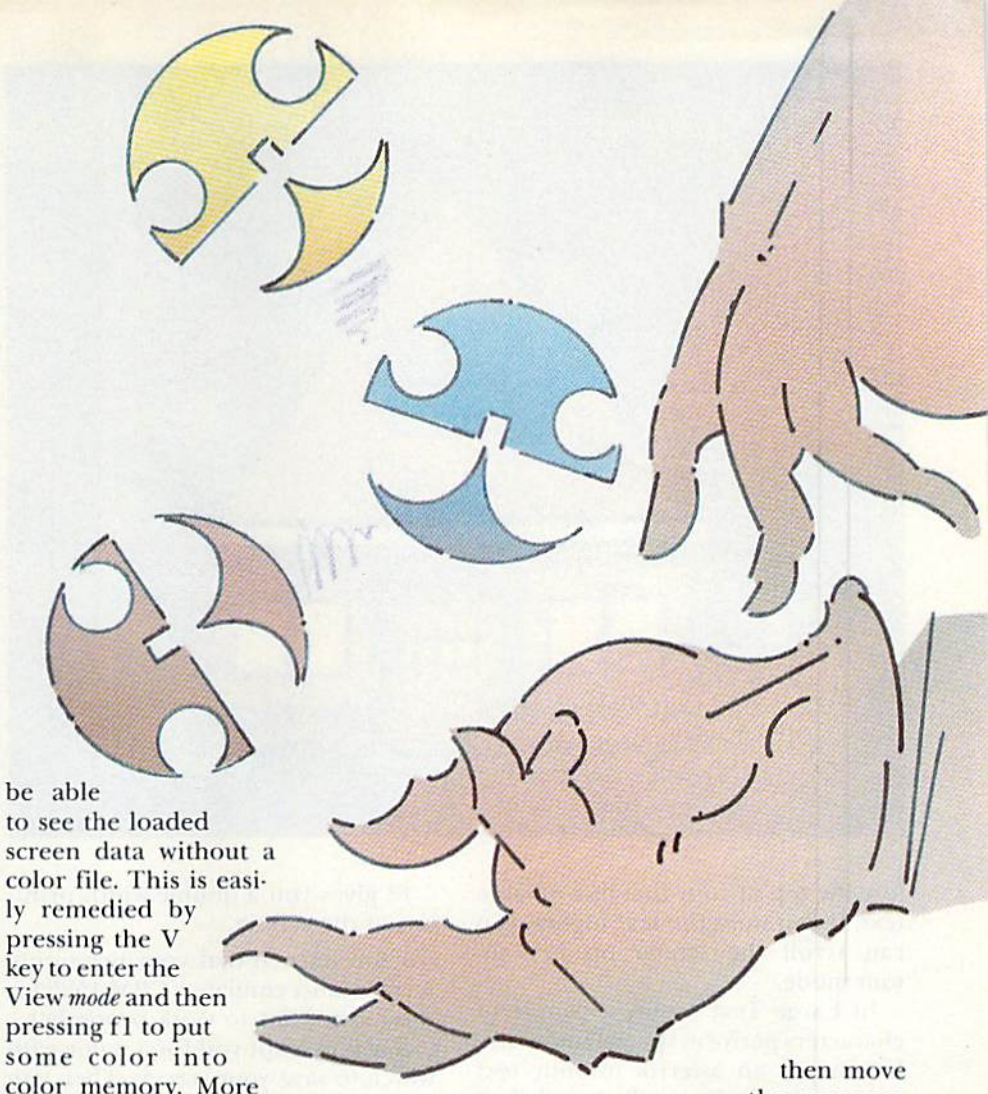
With ScreenViewer 64, you can establish a sequence of screens from ScreenMaker 64 or GraphMaker 64 (*RUN*, April 1985). These will continuously be loaded and displayed, and you can determine the length of display through an easy-to-use menu. The number of screens you can use is limited by your disk space. ScreenViewer is especially helpful for use in business, education or community applications.

Using the ScreenBooter 64 program, you can display ScreenMaker 64's screens as title screens while long programs are being loaded. You simply use the *autostart boot*, which will first load and display a ScreenMaker 64 screen and then load and start a Basic or machine language program.

I wanted ScreenMaker 64 to be as easy to use as possible. For this reason, it has quite a few menus and prompts to keep you informed.

Using ScreenMaker 64

When you first run ScreenMaker 64, there will be a short pause as it



Pokes in some machine language support routines. Then you'll see the main menu, with the following available choices:

C for create a screen
L for load/edit a screen
E to end the program

Pressing E for end will just stop the program and give you a Ready prompt.

Pressing L for load will give you a prompt to enter the *exact* filename of the screen you wish to load. (Do *not* use a wildcard.) Then you'll be asked if you want to load a color file, too. The color file is the data for the screen color memory. This file would appear on the disk as FILENAME.C, where FILENAME is the name with which the screen data was saved. All GraphMaker 64 screens are saved this way, but, for reasons I haven't yet discussed, ScreenMaker 64 also allows you to save the screen data alone.

The reason you must not use a filename with a wildcard, such as FILEN*, is to ensure that ScreenMaker 64 will not load a color file such as FILEN*.C, which the disk drive would interpret as just FILEN*.

If you're unsuccessful in loading a file, you'll be given an error message. Pressing any key will then return you to the main menu.

If you succeed in loading a file, you'll be taken directly to the View menu. Even if you try to load a color file that isn't there, you'll still be sent to the View menu. Note that, on many Commodore 64s, you won't be able to see the loaded screen data without a color file. This is easily remedied by pressing the V key to enter the View *mode* and then pressing f1 to put some color into color memory. More about viewing options later.

Pressing C for create will send you to the Create menu, from which you can select:

C for Custom Screen mode
L for Large Text mode
V for View menu
M to return to the main menu

I'll discuss these in the order that they are listed.

Custom mode will display the current screen (which will be blank if you just started), with a flashing cursor that allows you to type in most of the characters available from the keyboard. You may also change the cursor color and use the reverse-on and reverse-off keys as usual.

The only key you can't use normally is the British pound key, which is used as an escape from Custom mode. If you need to use this key, make another key the escape key. To clear the screen, press the shift/CLR key. To scroll the screen up, move the cursor down to the bottom of the screen. To change an object's color, change the cursor color and then move the cursor over those objects.

The Large Text mode is for generating the large text mentioned earlier. If you plan to use large text with Custom mode text and graphics, then you should complete your large text before doing refinements and additions in Custom mode.

Upon entering Large Text mode, you'll see the current screen, if any, and a checkered cursor at the bottom left of the screen. You may then enter your text, numbers and a few other symbols (e.g., +, −, ?, !). When you press the return key, ScreenMaker 64 will put the large characters on the screen; they will be automatically centered unless the first character is a left arrow. The escape character from this mode is, again, the British pound key. You'll notice that after the first line of text is displayed, you don't get your cursor back right away. Pressing any key will get it back.

A maximum of five lines of large text may be displayed at once, and if, after entering five lines, you press a key other than the escape key, you'll

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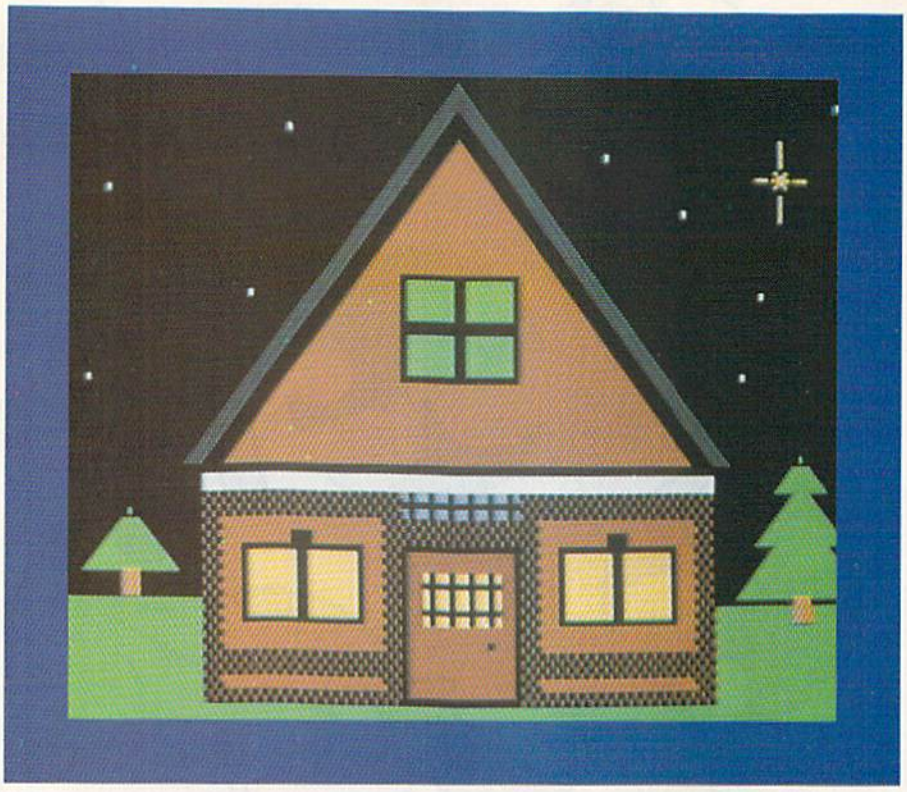


lose the top of your first line of large text. If you want the text higher, you can scroll the screen up in Custom mode.

In Large Text mode, a couple of characters perform special functions. If you put an asterisk in your text string, the string will be shifted slightly to the left of where it would normally be printed on the screen. The character @ will print a cursor down, so if you put an @ between characters in your text string, the large characters will slant downward on the screen. However, they won't be centered very well.

Pressing V from the Create menu will send you to the View menu, which has more information than any of the other menus. The top part of the screen has three options:

V displays the current screen
C takes you back to the Create menu
M takes you back to the main menu

The lower part of the View menu is framed by a single line. These options are available *only* from View *mode*, which means you must press V and then select one of these options:

f1 changes the color of all the characters on the screen each time you press it.

f3 changes the screen border color each time you press it.

f5 changes the screen background color each time you press it.

f7 gives you a single-width printout of the screen.

f8 gives you a double-width printout of the screen.

(Be forewarned that your printer/interface must emulate a CBM 1525 for these printouts to work properly!)

S will prompt you for a name with which to save your screen. Then you will be asked if you wish to save the color file, too. Note that disk errors will be reported to your screen without harm.

Any other key will return you to the View menu.

ScreenViewer 64

ScreenViewer 64 is a program that helps you get the most out of GraphMaker 64 and ScreenMaker 64. It does this by allowing you to set up displays of screens that have been created with either GraphMaker 64 or ScreenMaker 64.

By mixing graph, picture or text screens into a sequence that you can display either once or continuously, ScreenViewer 64 can be very effective as a communications or promotional tool for a business, school or club, or just for home entertainment.

Since ScreenViewer 64 allows you to save a *name file* to disk, you can reuse the display without having to reenter the screen's names again.

Using ScreenViewer 64

When you run ScreenViewer 64, you're first given the option of either creating or loading a name file, which is just a list of screen names. If you have previously run ScreenViewer64 and saved a name file, then you won't have to reenter the names of those screens again.

If you just want to view the screens and not save the name file, you still must choose the Create option and create the name file even if you don't want to save it for later use.

After pressing C for the Create option, you'll be asked how many screens you want to view. This is the number of screens to be shown by ScreenViewer 64. (A disk can hold a maximum of 83 screens, but, for most uses, not nearly that many will be needed.) You will then be prompted for the name of each screen. If you'd chosen the load option, the program would jump this section.

When all of the screen names have been entered, the next menu will give you the choice of continuing or editing. If you've entered a name incorrectly or just want to double-check for good measure, the Edit option will display the names on the screen.

After the names are displayed, you'll be asked which name to edit. If you don't want to edit a name, hit the return key. This is important to remember, since you can go back from all menus that don't have a flashing cursor by hitting the shift key along with the return key, and you can terminate all flashing cursor prompts by just hitting the return key.

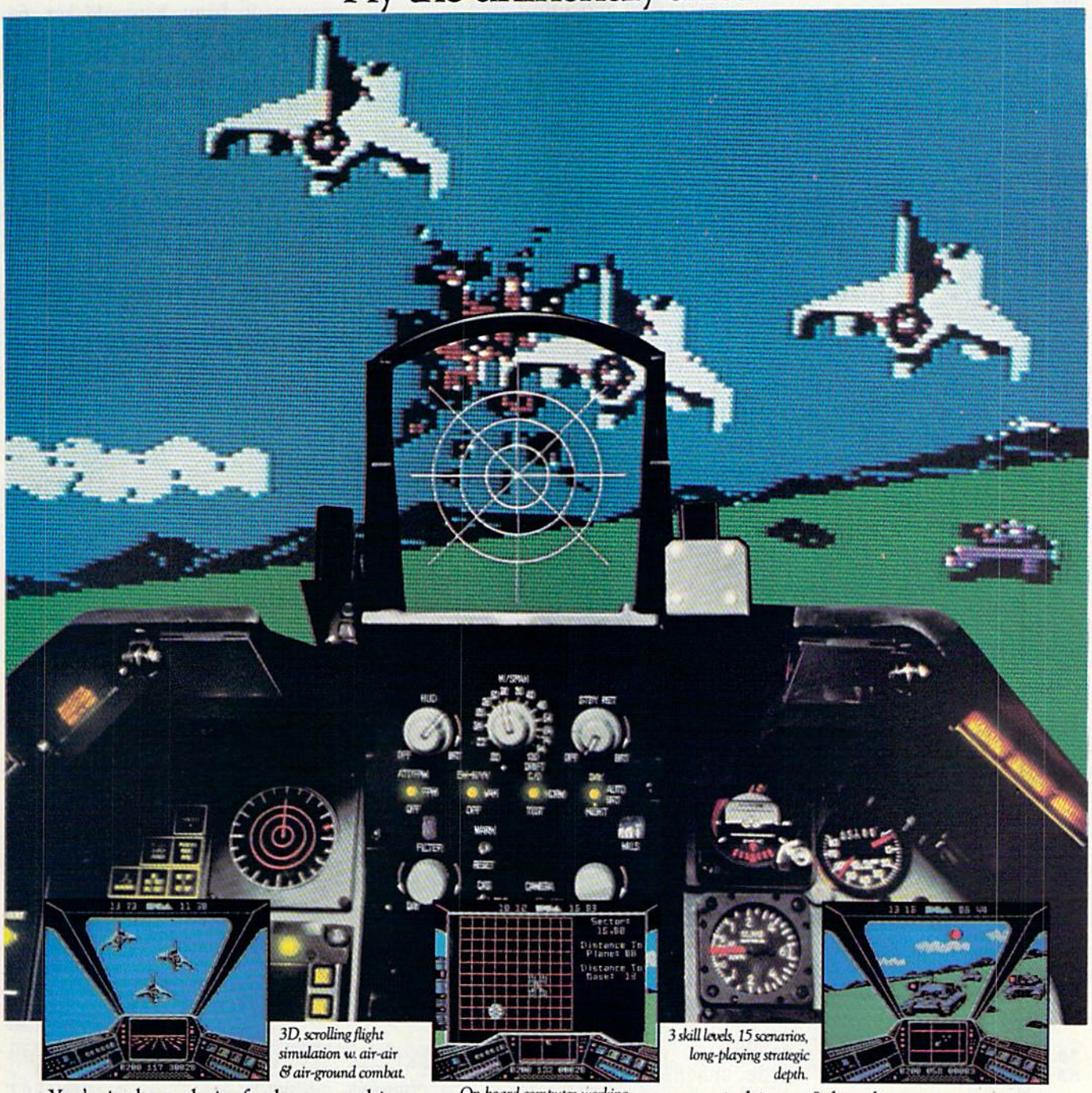
The next menu offers you the opportunity to save your name file or to view it without saving it. If you'd like, you may test-view your name file, then save it later.

Finally, you get two menus composed of viewing options. The first one lets you decide how long to display each screen, and the second allows a one-time or continuous display. If you wish to change the program to allow longer or shorter delays than the three that are available, you can alter the delay loop in line 830.

While ScreenViewer 64 is loading and displaying screens, you can skip to the next screen by pressing any key except the shift/return combination. Simultaneously pressing the shift and return keys will take you out of the viewing cycle and back to the Continue or Edit menu.

Remember that you can back out of any flashing prompt menu by hitting only the return key; you can back out of any other menu by hitting the

Fly the unfriendly skies.



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shift with the return key. When I say "back out," I mean that you can actually go back through the menus in this way.

ScreenBooter 64

ScreenBooter 64 will create boots for any of your programs. It will first load and display a ScreenMaker 64 title screen and then load and autostart the main program.

ScreenBooter 64 is easy to use. Just run it and follow the prompts. Be sure to have in the disk drive the disk on which you want to save the boot. And, of course, you must have the boot, the screen and the program that will be loaded by the boot all on the same disk.

ScreenBooter 64 will first ask you for the screen name. This is the title screen that the boot will load. The next prompt will be for the program name, which is the program that will be loaded and autostarted.

You'll then be prompted to enter color numbers (0–15) for the screen border, background and characters. These numbers correspond to the normal Commodore 64 numbering, with black as color 0 and light gray as 15. Finally, you'll be asked for the boot name, which is the name that will appear on the disk.

The title screens you create for ScreenBooter 64 don't need color files saved, since the boot will control the colors according to your choices.

Note that the boots must be loaded with 8,1 after the filename, such as LOAD"BOOT",8,1. When you do this, the boot should load, then load the screen and display it and, finally, load and start your program.

I hope you get as much use and enjoyment from ScreenMaker 64, ScreenViewer 64 and ScreenBooter 64 as you did from GraphMaker 64.

If you don't have the time or perseverance to type in the three programs, I'll supply all three on disk, plus some sample screens and a sample name file for the ScreenViewer 64, for $8 to cover costs. If you want a tape, send $5, but you'll have to do without the sample screens and name file. If you just want to ask a question, then send me a self-addressed stamped envelope for a reply. R

Address all author correspondence to Doug Smoak, 303 Heyward St., Columbia, SC 29201.

Listing 1. *ScreenMaker program.*

```
1 REM ********************************
                                    :REM*63
2 REM *{3Ø SPACEs}*                 :REM*52
3 REM *{2 SPACEs}'SCREENMAKER 64' (C) 1985{
  3 SPACEs}*                        :REM*223
4 REM *{3Ø SPACEs}*                 :REM*54
5 REM *{6 SPACEs}DOUG SMOAK{14 SPACEs}*
                                    :REM*237
6 REM *{6 SPACEs}3Ø3 HEYWARD ST.{9 SPACEs}*
                                    :REM*78
7 REM *{6 SPACEs}COLUMBIA, S.C.{2 SPACEs}29
  2Ø1{3 SPACEs}*                    :REM*139
8 REM *{3Ø SPACEs}*                 :REM*58
9 REM ********************************
                                    :REM*71
1Ø BO=5328Ø:BG=BO+1:POKE56296,12:POKE56297,
   12                               :REM*236
2Ø POKEBO,12:POKEBG,12:PRINT"{SHFT CLR}{COM
   D 4}SETTING UP";:DIMB$(63)       :REM*82
3Ø READA:IFA>-1THENPOKE68Ø+I,A:I=I+1:PRINT"
   .";:GOTO3Ø                       :REM*166
4Ø PRINT"{SHFT CLR}":POKE252,4:POKE254,192:
   SYS68Ø                           :REM*192
5Ø GOSUB198Ø                        :REM*154
6Ø DN$="{HOME}{24 CRSR DNs}":BL$="{36 SPACE
   s}"                              :REM*142
7Ø DN$=DN$+BL$+DN$:NL$=CHR$(Ø)      :REM*168
8Ø MN$="{CRSR RT}{SHFT -}{36 SPACEs}{SHFT -
   }"                               :REM*14Ø
9Ø T1$="{SHFT CLR}{CTRL 9}{COMD 4}{13 SPACE
   s}SCREENMAKER 64{13 SPACEs}{CTRL Ø}"
                                    :REM*128
1ØØ PRINTT1$                         :REM*4
11Ø POKEBO,12:POKEBG,12             :REM*224
12Ø PRINT"{CRSR DN}{CRSR RT}CHOOSE ONE:"
                                    :REM*16Ø
13Ø PRINT"{CRSR DN}{CRSR RT}C{LEFT ARROW}CR
   EATE A SCREEN"                   :REM*214
14Ø PRINT"{CRSR DN}{CRSR RT}L{LEFT ARROW}LO
   AD/EDIT A SCREEN"                :REM*186
15Ø PRINT"{CRSR DN}{CRSR RT}E{LEFT ARROW}EN
   D"                               :REM*2Ø4
16Ø GETG$                           :REM*162
17Ø IFG$="C"THEN24Ø                 :REM*18Ø
18Ø IFG$="L"THEN151Ø                 :REM*92
19Ø IFG$="E"THENPRINT"{SHFT CLR}":END
                                    :REM*3Ø
2ØØ GOTO16Ø                         :REM*226
21Ø :                               :REM*186
22Ø REM -------- CREATE MENU ----------
                                    :REM*194
23Ø :                               :REM*2Ø6
24Ø PRINT"{SHFT CLR}{CTRL 9}{COMD 4}{13 SPA
   CEs}CREATE A SCREEN{12 SPACEs}{CTRL Ø}"
                                    :REM*128
25Ø POKEBO,12:POKEBG,12             :REM*1Ø8
26Ø PRINT"{CRSR DN}{CRSR RT}CHOOSE ONE:"
                                    :REM*45
27Ø PRINT"{CRSR DN}{CRSR RT}C{LEFT ARROW}CU
   STOM SCREEN MODE"                :REM*77
28Ø PRINT"{CRSR DN}{CRSR RT}L{LEFT ARROW}LA
   RGE TEXT MODE"                   :REM*55
29Ø PRINT"{CRSR DN}{CRSR RT}V{LEFT ARROW}VI
   EW MENU"                         :REM*15
3ØØ PRINT"{CRSR DN}{CRSR RT}M{LEFT ARROW}MA
   IN MENU"                         :REM*135
31Ø GETG$                           :REM*57
32Ø IFG$="V"THEN37Ø                 :REM*241
33Ø IFG$="M"THEN1ØØ                  :REM*53
34Ø IFG$="C"THENGOSUB79Ø:GOTO57Ø     :REM*49
35Ø IFG$="L"THENGOSUB79Ø:GOTO175Ø    :REM*81
36Ø GOTO31Ø                         :REM*67
37Ø PRINT"{SHFT CLR}{COMD 4}{CTRL 9}{15 SPA
   CEs}VIEW MENU{16 SPACEs}{CTRL Ø}"
                                    :REM*139
38Ø POKEBO,12:POKEBG,12             :REM*239
39Ø PRINT"{CRSR DN}{CRSR RT}V{LEFT ARROW} V
   IEW CURRENT SCREEN"              :REM*2Ø7
4ØØ PRINT"{CRSR DN}{CRSR RT}C{LEFT ARROW} R
   ETURN TO CREATE MENU"            :REM*2Ø7
41Ø PRINT"{CRSR DN}{CRSR RT}M{LEFT ARROW} R
   ETURN TO MAIN MENU"              :REM*41
42Ø PRINT"{2 CRSR DNs}{CRSR RT}{COMD A}{5 S
   HFT *s}{COMD 4} AVAILABLE FROM VIEW MOD
   E{COMD 4} {5 SHFT *s}{COMD S}":PRINTMN$
                                    :REM*53
43Ø PRINT"{CRSR RT}{SHFT -} F1{COMD 8}{LEFT
    ARROW} CHANGE CHARACTER COLOR {COMD 4}
   {8 SPACEs}{SHFT -}":PRINTMN$     :REM*235
44Ø PRINT"{CRSR RT}{SHFT -} F3{COMD 8}{LEFT
    ARROW} CHANGE BACKGROUND COLOR{COMD 4}
   {8 SPACEs}{SHFT -}":PRINTMN$     :REM*65
45Ø PRINT"{CRSR RT}{SHFT -} F5{COMD 8}{LEFT
    ARROW} CHANGE BORDER COLOR{4 SPACEs}{C
   OMD 4}{8 SPACEs}{SHFT -}":PRINTMN$
                                    :REM*237
```

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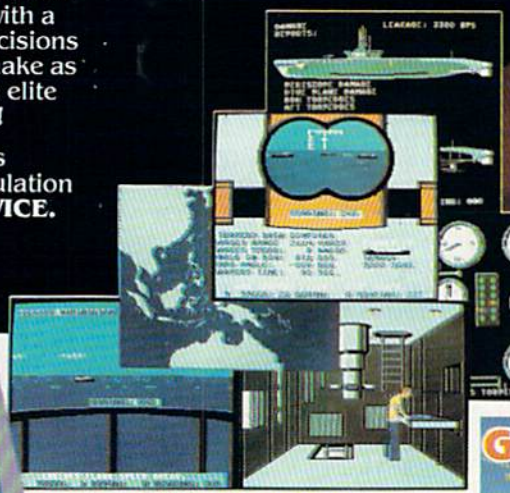

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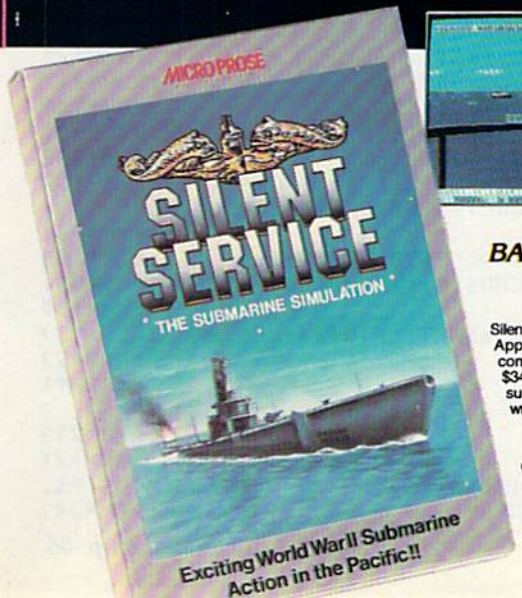

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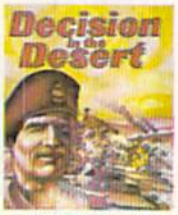

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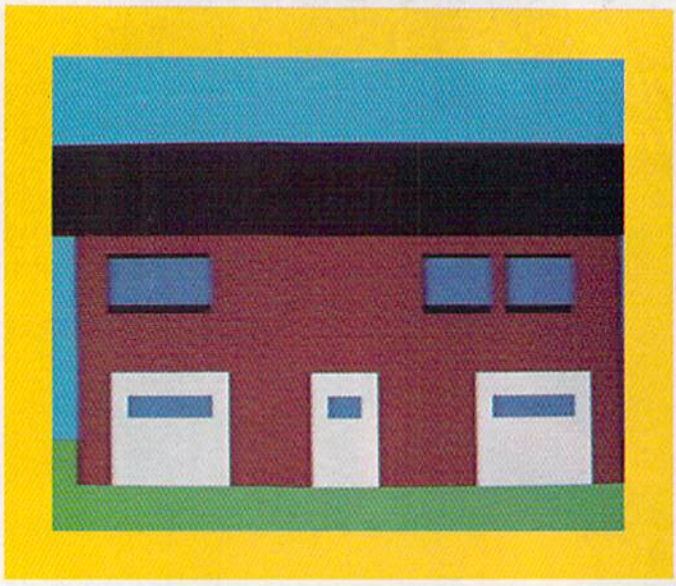

Listing 1 continued.

```
46Ø PRINT"{CRSR RT}{SHFT -} F7{COMD 8}{LEFT
     ARROW} 1X PRINTOUT{3 SPACEs}{COMD 4}F8
    {COMD 8}{LEFT ARROW} 2X PRINTOUT{COMD 4
    }{2 SPACEs}{SHFT -}":PRINTMN$  :REM*117
47Ø PRINT"{CRSR RT}{SHFT -} S{COMD 8} {LEFT
     ARROW} SAVE CURRENT SCREEN{3 SPACEs}{C
    OMD 4}{9 SPACEs}{SHFT -}"      :REM*131
48Ø PRINT"{CRSR RT}{COMD Z}{36 SHFT *s}{COM
    D X}"                          :REM*187
49Ø GETG$                          :REM*237
5ØØ IFG$="V"THENGOSUB79Ø:GOSUB93Ø:GOTO37Ø
                                   :REM*15
51Ø IFG$="M"THEN1ØØ                :REM*233
52Ø IFG$="C"THEN24Ø                 :REM*2Ø
53Ø GOTO49Ø                        :REM*118
54Ø :                               :REM*6
55Ø REM -------- CURSOR ROUTINE --------
                                   :REM*32
56Ø :                              :REM*26
57Ø PRINT"{HOME}";                 :REM*248
58Ø P=1Ø24+PEEK(214)*4Ø+PEEK(211)+(PEEK(211
    )>39)*4Ø                       :REM*2Ø6
59Ø CH=PEEK(P):K=128*(CH>127)-128*(CH<128)
                                   :REM*3Ø
6ØØ POKEP,CH+K:POKEP+54272,PEEK(646):T=TI+2
                                   :REM*114
61Ø IFTI>TTHENK=-128*(K=Ø)*(CH>127)+128*(K=
    Ø)*(CH<128):GOTO6ØØ            :REM*22
62Ø GETZ$:IFZ$=""THEN61Ø           :REM*4Ø
63Ø IFZ$="{LB.}"THENPOKEP,CH:GOSUB86Ø:GOTO2
    4Ø                             :REM*118
64Ø POKEP,CH:PRINTZ$;              :REM*116
65Ø IFZ$=CHR$(34)THENPOKE212,Ø     :REM*9Ø
66Ø IFZ$="{SHFT INST}"THENPOKE216,Ø :REM*96
67Ø GOTO58Ø                        :REM*25Ø
68Ø :                              :REM*146
69Ø REM ------- ERROR CHANNEL READ -----
                                   :REM*98
7ØØ :                              :REM*166
71Ø OPEN15,8,15                    :REM*1Ø6
72Ø INPUT#15,A,B$,C,D:CLOSE15      :REM*198
73Ø RETURN                          :REM*22
74Ø GETA$:IFA$=""THEN74Ø           :REM*44
75Ø RETURN                         :REM*42
76Ø :                              :REM*226
77Ø REM ---------- GET SCREEN ----------
                                   :REM*49
78Ø :                              :REM*247
79Ø POKE252,192:POKE254,4:SYS68Ø   :REM*213
8ØØ POKE252,196:POKE254,216:SYS68Ø :REM*157
81Ø POKEBO,PEEK(56296):POKEBG,PEEK(56297)
                                   :REM*165
82Ø RETURN                         :REM*113
83Ø :                               :REM*41
84Ø REM ---------- PUT SCREEN ----------
                                   :REM*157
85Ø :                               :REM*61
86Ø POKE252,4:POKE254,192:SYS68Ø   :REM*249
87Ø POKE56296,PEEK(BO):POKE56297,PEEK(BG)
                                   :REM*195
88Ø POKE252,216:POKE254,196:SYS68Ø :REM*119
89Ø RETURN                         :REM*183
9ØØ :                              :REM*111
91Ø REM -------- VIEW OPTIONS ----------
                                    :REM*3
92Ø :                              :REM*131
93Ø GETG$:IFG$=""THEN93Ø            :REM*31
94Ø IFG$="S"THENGOSUB86Ø:GOTO1Ø4Ø  :REM*235
95Ø IFG$="{FUNCT 1}"THENSYS7Ø3:GOTO93Ø
                                   :REM*197
96Ø IFG$="{FUNCT 3}"THENPOKEBG,(PEEK(BG)+1)
    AND15:POKE56297,PEEK(BG):GOTO93Ø
                                   :REM*251
97Ø IFG$="{FUNCT 5}"THENPOKEBO,(PEEK(BO)+1)
    AND15:POKE56296,PEEK(BO):GOTO93Ø:REM*37
98Ø IFG$="{FUNCT 7}"THENTX$=CHR$(15):GOSUB1
    19Ø                            :REM*239
99Ø IFG$="{FUNCT 8}"THENTX$=CHR$(14):GOSUB1
    19Ø                            :REM*249
1ØØØ GOSUB86Ø:RETURN                :REM*35
1Ø1Ø :                             :REM*221
1Ø2Ø REM --------- SAVE SCREEN ---------
                                   :REM*245
1Ø3Ø :                             :REM*242
1Ø4Ø F1$="":F2$="":POKEBO,12:POKEBG,12
                                    :REM*78
1Ø5Ø OPEN15,8,15,"UI":CLOSE15      :REM*126
1Ø6Ø PRINT"{SHFT CLR}{COMD 4}{CRSR DN}{CRSR
     RT}SCREEN NAME";              :REM*242
1Ø7Ø INPUTF1$:IFF1$=""THENRETURN   :REM*2Ø4
1Ø8Ø IFLEN(F1$)>14THEN1Ø6Ø          :REM*28
1Ø9Ø PRINT"{CRSR DN}{CRSR RT}SAVE COLOR TOO
    ? [Y/N]"                       :REM*44
11ØØ GETA$:IFA$<>"Y"ANDA$<>"N"THEN11ØØ
                                   :REM*22
111Ø GOSUB79Ø                      :REM*228
112Ø FS=1:IFA$="Y"THENFS=2:F2$=F1$+".C"
                                   :REM*198
113Ø F$=F1$:S=1Ø24:E=2Ø24:GOSUB133Ø:GOSUB13
    9Ø:IFATHENRETURN                :REM*7Ø
114Ø IFFS=2THENF$=F2$:S=55296:E=56298:GOSUB
    133Ø:GOSUB139Ø                 :REM*1Ø8
115Ø RETURN                        :REM*188
116Ø :                             :REM*116
117Ø REM --------- SCREEN DUMP ---------
                                   :REM*218
118Ø :                             :REM*136
119Ø R$=CHR$(145):V$=CHR$(146):OPEN4,4:CMD4
    :G=PEEK(648)*256               :REM*144
12ØØ PRINTR$+TX$;                   :REM*32
121Ø FORP=GTOG+999                 :REM*242
122Ø C=PEEK(P):C$=""               :REM*146
123Ø IF(P-G)/4Ø=INT((P-G)/4Ø)THENPRINTCHR$(
    8)+CHR$(13)+TX$;               :REM*222
124Ø IFC>128THENC=C-128:C$=CHR$(18):REM*162
125Ø IFC<32ORC>95THENC=C+64:GOTO127Ø
                                   :REM*232
126Ø IFC>63ANDC<96THENC=C+128      :REM*198
127Ø C$=C$+CHR$(C):IFLEN(C$)>1THENC$=C$+V$+
    R$                              :REM*8Ø
128Ø PRINTC$;:NEXT:PRINT#4:CLOSE4  :REM*157
129Ø RETURN                         :REM*73
13ØØ :                              :REM*1
131Ø REM -------- PUT FILENAME ---------
                                   :REM*219
132Ø :                              :REM*21
133Ø FORI=1TOLEN(F$):POKE749+I,ASC(MID$(F$,
    I,1)):NEXT                     :REM*2Ø7
```

Continued on p. 86.

PRE-PUBLICATION ANNOUNCEMENT

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Video Monitors for Your C-128

By MARGARET MORABITO

Before you begin anticipating the demise of your 1702 monitor and the purchase of a new monitor for your C-128, stop and read this article. It could save you lots of money.

There are two misconceptions concerning the peripherals that will work with the C-128. One is that you have to buy the new 1571 disk drive to use all three modes; the other is that you have to buy a new 1902 RGBI monitor to use the 80-column capabilities of the C-128.

The first misconception was addressed in *RUN*'s August 1985 issue. You don't have to buy the 1571 to use the CP/M and 128 modes. You can use the 1541 in all three modes on the C-128.

Now, for the monitor question.

The 1702 with the 128

Early articles about the C-128 stated that you needed the new 1902 RGBI color monitor to take advantage of the 80-column capabilities of the C-128. What these articles failed to mention was that you can also use the 1702 composite monitor for 80-column displays. In fact, the 1702 gives a surprisingly clear 80-column display in both 128 and CP/M modes.

To get this 80-column display, you'll have to connect a video cable from the RGBI port on the C-128 to the front video port on the 1702. It's not an excellent quality display, but for no more than $8, it's an alternative to purchasing the 1902.

I tested the 1702 on the C-128 with a cable that I made with about $8 worth of parts from Radio Shack. This cable gave me a readable 80-column, black-and-white display on my 1702 monitor. I had originally made the cable to connect a Zenith monochrome monitor to my C-128. (I haven't tried to make a cable for using 80-column color.)

What makes this so interesting is that if you have a 1702, you don't immediately have to shell out an extra $250–$300 for a new RGBI monitor or even $90 for a monochrome monitor. Eventually, you might want to buy one of these, but you can postpone the purchase and get going with your 1702 in 80 columns for 128 and CP/M modes. Applications such as word processing, database management and spreadsheet analysis are especially well suited to 80-column black-and-white displays.

Of course, the 1702 is excellent for displaying color in 40 columns, in both CP/M and 128 modes, as well as the C-64 mode. In 40 columns, you get all the same colors as you do with the C-64. In addition, you can use all of the new graphics and sprite commands, as well as the split-screen modes.

Combining 40- and 80-Column Displays

You may have been wondering about hooking up two video cables to the C-128. Several early articles mentioned this in reference to the 1902 RGBI monitor. One cable is for composite color graphics and 40-column text displays, and the other is

Early articles about the C-128 stated that you needed the new
1902 RGBI color monitor to take advantage of the 80-column capabilities of
the C-128. What these articles failed to mention was that you can also
use the 1702 composite monitor for 80-column displays. In fact, the 1702
gives a surprisingly clear 80-column display in both 128 and CP/M modes.
(The above excerpt is double-spaced. Of course, you can single-space your
document. Have fun with your C-128!)
commodore
CONTROL
SHIFT

SHARON WHITE/BOB PACKERT

for the 80-column color displays. You shift back and forth between these two modes by pressing ESC X and then flicking a switch on the monitor. You can access only one screen at a time; the screen that is not being used will hold its last display until you return to it.

Did you know that you can utilize this same dual video feature on the 1702 composite monitor? You simply connect two cables: one from the C-128's video port to the back of the monitor, as is usual for the 40-column display, and the other, for the 80-column display, from the C-128's RGBI port to the video port on the front of the monitor.

It's quite interesting to be working with two screen displays. You just have to make sure to flick the switch on the back of your 1702 to toggle between the 40- and 80-column modes.

The 80-Column Cable

On the C-128, the RGBI port carries the 80-column signal. Rather than waiting for Commodore or a third party to come out with a cable that I could connect to the RGBI port, I made one.

If you want to do the same, you'll have to buy a subminiature, 9-pin male connector (Radio Shack catalog #276-1537), a few feet of microphone cable (single conductor, with shield) and a standard phono plug. (Pin 1 is the ground connection and pin 7 is the monochrome signal.) You just have to solder onto these two pins the two wires of the microphone cable; the center wire goes to pin 7, and the outer wire mesh goes to pin 1.

You should also put on a connector hood (catalog #276-1539) to protect the soldered connections. Don't make the cable longer than necessary. The shorter the cable, the clearer your 80-column display.

Third-Party Monochrome Monitors

A third-party monochrome monitor can be used with the C-128 for an excellent 80-column display. I tested the C-128 with a Zenith ZVM 123 monochrome monitor. The cable I described above connects the C-128's RGBI port to the back of this monochrome monitor and gives a crisp, clear 80-column display in 128 and CP/M modes. I find that a monochrome monitor fits my requirements for word processing and database management quite well.

If you want a 40-column display in C-64 mode, you must unplug the cable that you made and insert the composite monitor cable.

If you have a monochrome monitor and a 1702, you can leave them both connected to the C-128 and just toggle between them whenever you wish. Pressing ESC X is the toggle command.

Using a TV with the C-128

A television set will give you a very good quality 40-column display on the C-128, but I wasn't able to get an 80-column display with my black and white television set. While the signal did come through, it had a lot of interference and wasn't readable.

These are the most common video monitors people are likely to use on the C-128. Fortunately, the C-128 was built with the flexibility to use these monitors in both 40 and 80 columns. R

Margaret Morabito, c/o RUN *editorial, 80 Pine St., Peterborough, NH 03458, is the author of* The C-128 PC Handbook, *published by DataMost.*

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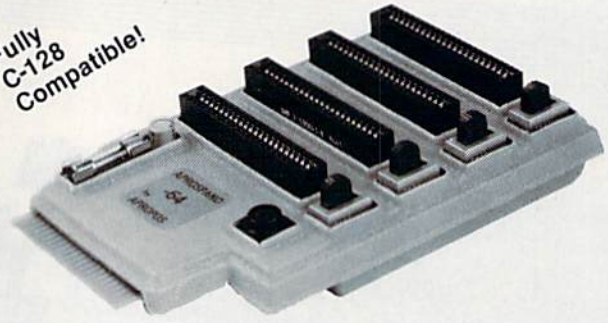

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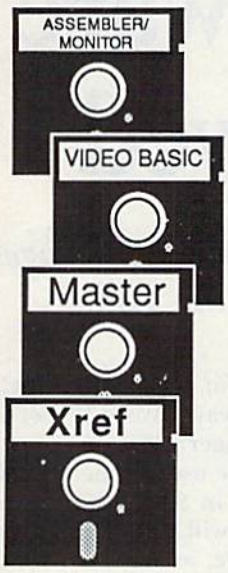

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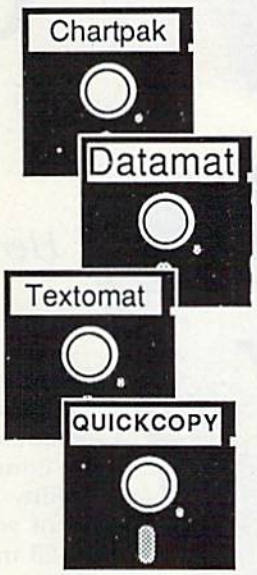

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C-128 Software Has Arrived

Here's a preview of three software packages developed especially for the 128.

If you recently purchased, or are considering buying, a Commodore 128, one of your main concerns is software availability. Although you can run all of your C-64 programs on the 128 in the 64 mode, you will still want to make use of the expanded power that the 128 mode offers.

Timeworks (444 Lake Cook Road, Deerfield, IL 60015) is one established software company that has dedicated serious efforts toward producing quality programs for the C-128. The people at Timeworks are viewing the machine as a computer with the potential for serious small-business applications, and not simply as a computer for games, hobbies or home uses.

One sure sign that the packages Timeworks is developing for the 128 are serious business programs is that they have been developed on the IBM PC and simply translated over to the C-128. Thus, the IBM and 128 versions offer very similar features.

A representative from Timeworks visited the *RUN* offices this summer and demonstrated three new programs that they were putting together for the 128—SwiftCalc 128 (with Sideways), Word Writer 128 and Data Manager 128.

Each package uses all the available 128K of RAM in 80-column format. Each program will auto-boot with the 1541 disk drive, as well as with the new and faster 1571. The three are fully integrable, so you can interchange data among the programs.

The three programs offer pull-down menus, which you choose from the menu bar that is displayed across the top of the screen. And a press of the help key will result in a pop-up window that scrolls the complete list of keys and commands available to you (this information is also provided on a reference card).

These features, which you can access at any point while you are working with the programs, makes it easy to become familiar with the packages. Although these are powerful and multi-featured applications programs, you won't have to spend untold hours figuring out how to use them.

The following brief reviews should provide you with a glimpse of what kind of software is in store for C-128 owners. (Each program retails for $69.95.)

Word Writer 128

Timeworks' Word Writer for the C-128 transforms the computer into a

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The complete 1541 enhancement system . . .

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The 1541 is the slowest disk drive on planet earth. Even simple operations seem to take forever. Quickloaders and Fastloaders that software-patch the operating system are vulnerable to being knocked out of memory, rendering them totally useless. Even Flashier products that require permanent modifications to the 64 and 1541 can't compete with the blinding speed of STARDOS.

STARDOS accelerates every (yes, we said every) function of the 1541 disk drive. Other fast loaders only load PRG files faster. STARDOS also speeds up SEQ, REL, USR and DIRECT ACCESS files. Everything including FORMAT, VERIFY, SCRATCH, VALIDATE, INITIALIZE and COPY are much faster. In addition STARDOS adds a vast array of easy to use commands all at the touch of a key.

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- STARDOS is fully expandable for multiple fast disk drives
- Easy (5 minute) plug in installation. User friendly manual
- 100% compatible with software and serial bus peripherals
- Adds years of life to your disks and drive in reduced wear
- Cures a number of bugs in the Commodore 64 and 1541 disk drive including :
  - The damaging 'Head Knock' that can mis-align your 1541
  - The @: Save with replace bug!!
  - The Editor lock-up bug
- Harness the full power of your disk drive with the built in DOS wedge
- Lock/unlock files and protect/unprotect disks from the keyboard
- Powerful sector editor allows direct viewing of diskette
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professional-quality word processor with the ability to compete against other 80-column personal computers costing several times as much (namely, the IBM PC).

Since Word Writer operates exclusively in the 80-column mode, it requires the use of the C-128's RGBI port and appropriate video cable.

Word Writer is a very refined package that is full of such up-to-date functions as a built-in screen calculator and a dictionary equipped with a spelling checker.

My favorite function is the Text-formatting command, which allows tremendous amounts of text to be inserted anywhere within a document. The entire document can then be formatted, in approximately one second, by pressing three keys.

Eleven function keys are made available by using the Commodore key with the f1, f3 and f5 keys. Pressing the Commodore and f3 keys simultaneously will produce the program's on-screen calculator. The calculator's position on the right-hand side of the screen corresponds nicely with the numeric keypad's position on the keyboard.

The pull-down menus instantly create vertically scrolling windows that overlay the text (until you press the escape key).

The spelling checker works in conjunction with a dictionary on the Word Writer disk and a user-defined sub-dictionary that you can create by saving up to 1000 words in a file. The sub-dictionary is excellent for recording brand names, cities and towns or people's names.

Using Word Writer on the C-128 is an absolute joy. From the auto-boot start (simply load the disk and turn on the computer), to the Return to System menu option, which deletes the program without your having to turn off the computer, I found nothing but the highest quality.

Both the novice and the experienced user will find that learning to utilize all of Word Writer's functions is simply a matter of walking through the pull-down menus. You'd have a hard time finding a friendlier word processor on the market.

Tim Walsh
***RUN* staff**

SwiftCalc 128

Although my review copy of the SwiftCalc spreadsheet was not 100% complete, the program looked quite promising. SwiftCalc was demonstrated on an RGB color monitor, and it takes advantage of the 80-column color capabilities of the C-128. I did most of my work with it on a composite monochrome monitor.

With SwiftCalc in place, you have 57,085 bytes free and a large 250-row by 250-column matrix, giving you a total of 62,500 cells to fill. The matrix has solid vertical lines between columns for easy column delineation.

The program calculates mathematical functions with up to 17-digit precision, and allows you to use minimum and maximum values, averages, sums, integers, absolute values and exponential notation. You can even figure the present and future value of a dollar and the values of annuities. It also has an If-Then-Else option and an automatic range calculation for determining "what if" situations within your spreadsheet. The C-128's numeric keypad is a welcome feature for use with this program.

SwiftCalc also has a graphing feature. Although this isn't a highly sophisticated graphing program, it does present a graphic representation of a column's data. This feature is not intended for printouts.

SwiftCalc does give you extensive options for printing out either part or all of your spreadsheet. You can print out your reports horizontally, rather than vertically, with Sideways, a program included with SwiftCalc that rotates your spreadsheet 90 degrees. This allows continuous printing of as many columns as you need.

SwiftCalc takes full advantage of the easy-to-use pop-up windows and pull-down menus that the 128 mode can accommodate.

Timeworks has taken care of the transition from IBM's ten function keys to the C-128's eight by using the Commodore key in conjunction with the f1, f3, f5 and f7 keys. This way, you really have ten function keys to use for cell and row manipulation. You also have a Sound (on and off) command and color control.

The seven functions available from the menu bar are too extensive to cover in detail here. Suffice it to say that everything you could possibly need is present in SwiftCalc.

Entering numbers and text into this spreadsheet is quite simple. You don't have to activate a text or number mode; you simply type in the information. The program determines whether you are typing numbers or words. If you enter data that exceeds the on-screen column width, SwiftCalc will automatically stretch the column to accommodate the overflow.

Timeworks has done an excellent job with SwiftCalc, demonstrating to prospective owners the sophisticated level of software that the C-128 can accommodate.

Margaret Morabito
***RUN* staff**

Data Manager 128

The version of Data Manager 128 that I saw was about 75% completed; thus, there were still a few kinks that needed to be worked out. What I did see impressed me as a powerful and flexible database management system that takes full advantage of the C-128's potential.

The program is form-oriented, set up in such a way that the records that you create look much like a form that you might see on paper. This feature of Data Manager 128 allows you to view an entire record at once (even before you've entered any data), so that you can see how it will look when completed. The program will hold a maximum of 64 pages (screens) per record.

Timeworks' Data Manager 128 is a very flexible database. It offers a Transfer option, which allows you to alter the setup of your files without having to reenter all your data. (With many other databases, you cannot add or delete a field once your file has been created.)

The program allows for a maximum of five possible sorts (primary, secondary, and so on); you can sort data alphabetically, numerically, chronologically or by any combination of the three. Data Manager lets you choose from two chart options—frequency (bell chart) and cross reference (vertical pie chart).

Printing options include mailing label, record dump and report formats. Data Manager 128 can accommodate a calculation field, which will handle all standard mathematical functions.

In creating Data Manager for the C-128, Timeworks has succeeded in making a program that is both powerful and easy to use.

If these programs are any indication of the quality of software that will be coming out for the Commodore 128, computerists have a lot to look forward to.

Susan Tanona
***RUN* staff**

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Telecomm

Electronic Mail: MCI Mail and EasyLink

By MARGARET MORABITO

The postman always rings twice, but with electronic mail services, letter pickup and delivery is only a phone call away.

Many people think that computerized mail service requires that both the sender and the receiver have a computer. This is true when you are referring to the general-interest on-line services such as CompuServe's EasyPlex and The Source's Source-Mail. However, on-line services that are totally dedicated to mail delivery let you use your computer to create and send documents to anyone, anywhere in the world.

MCI Mail and EasyLink are two major on-line networks that will deliver mail to other subscribers or to non-computerists. You can join MCI Mail and EasyLink directly, or you can access them through another service that offers them as part of its larger offerings.

The Dow Jones News/Retrieval, for example, gives you free access to MCI Mail. If you're a subscriber to DJN/R, then you can become a member of MCI Mail and access MCI through DJN/R's main menu. Similarly, Delphi offers access to EasyLink's telex service.

In addition to the national on-line mail services, there are also hundreds of local bulletin boards that have their own mail delivery among their computer users. These BBSs will only deliver messages to other computer owners.

The benefits of dedicated mail services are numerous. If you need to send large quantities of mail on a regular basis, you'll appreciate MCI Mail and EasyLink. You need only type in the document you want to send and the addresses of the recipients. MCI Mail and EasyLink will take care of the rest. They will print out the letters, address and stuff the envelopes, and deliver the entire batch of mail within a time frame determined by you.

The individual who doesn't send large amounts of mail, but who wants to get a document delivered quickly might want to look into these services. For example, if you have already composed your text on a word processor, all you have to do is upload your text file into MCI Mail or EasyLink. The document can be sent instantly to another computer's mail box, or it can be printed and sent by speedy courier delivery or standard postal delivery.

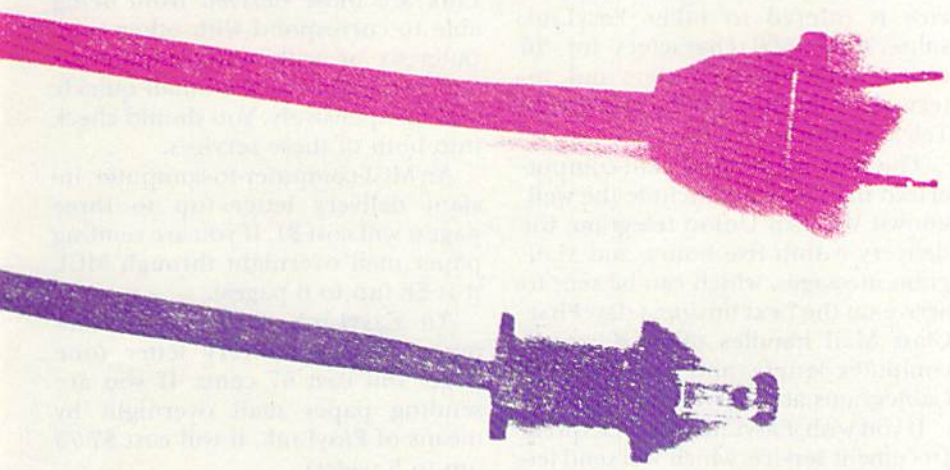
MCI Mail

By using MCI Mail, you can communicate with anyone in the world who has a postal address, anyone who resides in the U.S. and can receive overnight courier delivery, any Telex user in the world and any MCI Mail subscriber in the world.

Your mail is delivered instantly to other subscribers (up to 500 characters for 45 cents). Overnight letters can be delivered to over 20,000 cities by the U.S. postal service (up to six pages for $8). If you're really in a rush, a message can be hand delivered (in any of 18 U.S. cities) by courier within four hours (up to six pages for $30).

You aren't limited to speedy deliv-

unications



eries, however; you can send your documents by regular First Class U.S. mail (up to three pages for $2). You can even send and receive graphics through MCI Mail. Prices for these various types of deliveries will tend to be lower for a larger volume.

MCI has high-speed laser printers in major cities that will print out hard copies of your computer-originated documents. When you send a message via MCI, the computer immediately routes it to the printer closest to the destination. Your text is printed, packaged in an MCI Mail envelope and then handed over to a courier or the U.S. postal service for first-class delivery.

Your letter can be printed on the standard MCI letterhead, or you can, if you want, register your individualized letterhead and your signature with MCI Mail. That way, whenever you want to send signed documents on your own stationery, you simply upload your document into MCI Mail or create it on-line and send it with your customized format. You pay an annual $20 fee for this particular option. If you just want to send mail on MCI Mail stationery without a signature, you pay only for the cost of delivery.

There is no sign-up charge for MCI Mail, and you aren't charged for on-line time; you pay only for your local access phone charges. You can log on and take a tour of the system for free; during this time, you can practice preparing and editing messages or just read the Help files. The only time you receive a bill from MCI is when you actually send a message and for your annual mailbox fee of $18.

You will discover that MCI Mail is useful for personal correspondence and business communications. A business could easily and inexpensively devote a Commodore 64 or Commodore 128 to the purpose of sending and receiving electronic mail.

MCI can also be useful for bulk mailing and will store your mailing lists in their mainframe computer. For example, to send an update to your clients, you simply transmit the text to MCI and indicate the list of names to which it should be sent. For this address storage service, you pay a monthly $10 fee.

You can join MCI Mail through the DJN/R and send and receive mail simply by accessing MCI Mail through the DJN/R main menu. You can also access DJN/R via MCI Mail. If you aren't a DJN/R member, you can join MCI Mail by phoning 800-MCI-2255. Or, you can type in and run Donald Stoner's Electronic Mail program (see the sidebar accompanying this article) and join while on-line. Thereafter, you can use Stoner's program whenever you wish to log onto MCI Mail and send or receive mail.

After you have registered and received your user name and password, you can access MCI Mail directly through your local Tymnet access number. When logging onto MCI Mail using Tymnet, you will be prompted for your terminal identifier once connection with Tymnet has been made. Respond by typing A.

Then, at the Log-In prompt, type MCIMAIL and press the return key. Next, you'll be prompted for your user name and password. After entering these, you'll be inside MCI Mail and can readily follow the menu prompts.

Electronic Mail Services

In addition to MCI Mail and EasyLink, there are dozens of quality electronic mail services open for both individuals and businesses. Here is a list of just some of the many that are available.

Delphi Mail (Delphi)
3 Blackstone St.
Cambridge, MA 02139
800-544-4005

EasyPlex (CompuServe)
PO Box 20212
5000 Arlington Center Blvd.
Columbus, OH 43220
800-848-8199

ECHO
Electronic Communications for the Home and Office
4739 Alla Road
Marina del Rey, CA 90291
213-823-8415

ITT Dialcom
Dialcom, Inc.
1109 Spring St.
Silver Spring, MD 20910
301-588-1572

ITT Speedmail
ITT Communications and Information Services
100 Plaza Drive
Secaucus, NJ 07096
201-330-5000

OnTyme
TymeShare, Inc.
20665 Valley Green Drive
Cupertino, CA 95014
408-446-6000

Quik-Comm
General Electric Information Services
401 N. Washington St.
Rockville, MD 20850
800-638-9636

RCA Mail
RCA Global Communications
PO Box 6880
Bridgewater, NJ 08807
800-526-3969

SourceMail (The Source)
1616 Anderson Road
McLean, VA 22102
800-336-3366

Telemail
GTE Telenet Communications Corp.
8229 Boone Blvd.
Vienna, VA 22180
800-TELENET

ZapMail
Federal Express
800-238-5355

EasyLink

MCI Mail is not the only electronic mail service available to microcomputerists. EasyLink, operated by Western Union, offers similar services for both individual and business users.

EasyLink, like MCI Mail, lets you send electronic mail to its subscribers and to people who don't have a computer. There are three methods of computer-to-computer message deliveries. EasyLink's Instant Mail service is offered to other EasyLink subscribers (500 characters for 26 cents), domestic telex users and, internationally, through the worldwide Telex network.

The four methods of non-computerized mail delivery include the well-known Western Union telegram, for delivery within five hours, and Mailgram messages, which can be sent to arrive on the next business day. First-Class Mail handles other domestic computer letters, and international Cablegrams are delivered overnight.

If you wish, EasyLink has an Express Document service, which will send letter-quality documents, hand-delivered in two hours to most major cities (up to ten pages for $22.50) or overnight to other U.S. communities. If you're sending an Express document, you can type in your own letterhead for each document that you send, but, unlike MCI Mail, you cannot store your letterhead in EasyLink.

You can log on to EasyLink to get an idea of how it operates before subscribing. Just call on-line to 1-800-325-4112. When you are prompted for EasyLink I.D., type USR 999999 TEST.TEST and press the return key. At the next prompt, type /Help; you'll then enter EasyLink and be given a detailed summary of its Instant Mail Service.

In order to register, or for more information, you can phone 1-800-527-5184. There are two options for payment upon registration. For domestic use, you can pay a $25 registration fee and then pay only for your usage on a monthly basis. Otherwise, you can waive the registration fee and pay a monthly minimum usage fee of $25.

The occasional user will probably want to choose the first option—pay your registration fee, and then just pay as you send. The bulk-mail user will more likely want to use the second option. International fees are more expensive, and you should call EasyLink for particulars.

When you sign up, you'll receive a password, an identification number, an electronic mailbox number, an EasyLink directory listing and an international CI Telex number. EasyLink also offers FYI News, which holds several news-related databases that you can access while on-line.

Conclusion

The benefits of stand-alone mail services such as MCI Mail and EasyLink are those derived from being able to correspond with other computerists or with non-computerists and being able to send mail quickly and inexpensively. You should check into both of these services.

An MCI computer-to-computer, instant delivery letter (up to three pages) will cost $1. If you are sending paper mail overnight through MCI, it is $8 (up to 6 pages).

An EasyLink computer-to-computer, instant delivery letter (one page) will cost 57 cents. If you are sending paper mail overnight by means of EasyLink, it will cost $7.75 (up to 5 pages).

You might want to compare them with non-computerized overnight delivery services such as Federal Express, Purolator Courier and the U.S. Postal Service. A Federal Express letter (picked up) will cost $14 (up to 4 oz.). A Purolator Courier letter (picked up) will cost $12.75 (unlimited weight for a 9 by 12 envelope). A U.S. Postal Service letter (no pick up) will cost $10.75 (up to 2 pounds).

Your best bet is to spend some time evaluating the kinds of correspondence that you'll be sending. When deciding upon which service to use, consider how often you send correspondence, the length of your documents and the speed of delivery you require.

For more information, contact: *MCI Mail, Box 1001, 1900 M St., NW, Washington, DC 20036 (800-MCI-2255)* or *EasyLink Instant Mail Service, PO Box 37472, Omaha, NE 68137 (800-527-5184, ext. 10).*

Next month, *RUN* continues its series on telecommunications with a look at two major Commodore special interest groups and the newly established Commodore on-line network, QuantumLink. R

Address all author correspondence to Margaret Morabito, c/o RUN *editorial, 80 Pine St., Peterborough, NH 03458.*

E-Mail Terminal

This short terminal program is custom-made for MCI Mail.

By DONALD L. STONER

One of the nice features of the MCI Mail service is the ease with which you can sign up. You needn't fill out any complicated forms nor visit your local computer dealer. You can access MCI Mail with any computer or terminal program, but the accompanying Electronic Mail program (Listing 1) lets you sign up on-line as well as access it in the future. As soon as you type in the program and save it, you can be in contact with MCI Mail.

Electronic Mail, written to run automatically on either the VIC-20, the C-64 or the C-128 (in C-64 mode), provides automatic dialing if you have the Commodore 1650 or any other auto-dial modem, such as the Autoprint Microconnection. Once the connection is established, Electronic Mail sends you your identification and password so you can log in automatically.

The program is written entirely in Basic, and can be saved either on disk or cassette. The lines are short to minimize the possibility of typing errors and to simplify debugging. The remark statements allow you to follow the program flow, but you needn't type them in (except line 710). If you're entering the program into an unexpanded VIC-20, you *must* delete the remark (except line 710), or the computer will run out of memory.

Auto-dialing is accomplished in lines 325–425. The dialing may be too fast for your telephone system. As soon as the program has finished the dialing sequence, pick up an extension telephone, switch off the modem and listen. You should hear a ringing or a busy signal. If you hear silence or the dial tone, it means your modem was not connected or it was dialing too fast.

If 24 and 12 (in lines 410 and 415) are too speedy for your telephone system, change them to 48 and 24, then reduce these numbers until your system starts misdialing. When you reach this point, increase the values enough to prevent the system from misdialing. Always keep the number in 410 twice the value of the number in 415.

The delay loop in line 425 determines the "interdigit waiting time." Again, this may be too fast for your system. If the program misdials (even with 48 and 24), double the value of the number in line 425, then reduce it until the point just before the dialing becomes unreliable.

On-Line Registration

Note the strings in lines 160 and 165. The word "register" is used for the identification and password strings. When you run the program, these strings are automatically sent to MCI, Inc. The MCI computer detects this ID and password and knows you want to sign up for their service. Note that you will not see the main MCI menu that is described below. Rather, you will be routed to the on-line registration program. Be prepared to answer a series of questions. Once MCI has the required registration information, it will ask you a series of demographic questions. Answers to these questions are optional.

After you complete the registration process, simply switch off the modem. In about five days, you should receive your new ID and password (sent by MCI Mail, naturally). Replace the word "register" in lines 160 and 165 with the new ID and password characters. Don't delete the " + CR$" in these lines or the program will lock up. Finally, save the revised program with your new ID and password as "MCI MAIL" or some other unique name.

Note that the register program is full-duplex, while MCI Mail is half-duplex. When you enter your new ID and password into the program, make sure you also remove the REM in line 710 (not the line itself). If you forget to do this, your keystrokes will not appear on your screen.

The next time you log in with Electronic Mail, the MCI computer will skip the registration section and take you directly into its message program.

Modifying the Program

In addition to adjusting the dialing speed, there are several other modifications you can make. If you have the Commodore Model 1600 (or other non-auto-dial modem), you can bypass the auto-dial section of the program. Do this by removing (or simply not typing) lines 300–425. You can also bypass the automatic ID and password entry if you delete lines 500–580. This will take you directly to the Terminal mode. Naturally, if you do this, you'll have to enter your ID and password manually.

Although the program will determine if you are using a VIC or C-64, it will not reformat the screen for the VIC's 22 characters. As a result, the screen instructions on a VIC-20 will be broken in the middle of several words. You may want to rewrite these instructions for a more pleasing display.

Using the Program

At this point, assume that you have received your unique ID and password from MCI, and that you have modified the program to bypass the registration. Let's enter a message to see how the MCI Mail system works. As mentioned earlier, you can go on-line and practice without accruing any charges.

Load Listing 1 in the normal manner for your disk or cassette. Next, make certain the modem and telephone line are properly connected. At this point, the switches should be in the O (originate), D (data) and F (full-duplex) positions.

As soon as you press the return key, the translation tables will load, and the program will automatically dial MCI. The MCI 800 numbers are extremely busy, so several redials may be required. The program will do this automatically. Note the value for RD in line 325. The program will redial up to ten times, if necessary.

There is another access number available if the redials seem excessive. If you have trouble getting through, try replacing the number in line 170 with 18003237751.

If you live in one of the cities where MCI has a direct-access telephone number (see the on-line Help file named Phones), use that number rather than the 800 number. You will find these numbers much less busy, and redials will seldom be required.

If your log-on is successful, you'll see a short welcome message and the news headlines (except on weekends), and you'll be advised if you have any waiting messages. Next, you'll see the main menu, as shown below.

You may enter:

SCAN	for a summary of your mail
READ	to read messages one by one
PRINT	to display messages nonstop
CREATE	to write an MCI letter
DOWJONES	for Dow Jones News/Retrieval
ACCOUNT	to adjust terminal display
HELP	for assistance

Command (or MENU or EXIT):

MENU takes you to a previous menu, if there is one. EXIT is the correct log-off term, rather than "off" or "bye."

Every prompt has an associated Help file. For example, if you want to learn more about the Scan command, simply enter HELP SCAN. If you reach a point where you don't know what to do, simply type HELP, and the system will tell you what Help files are available.

Before you start entering a message, you must set your terminal parameters. Enter ACCOUNT and press the return key. Enter YES to see your current settings. MCI assumes you live in the eastern time zone and have an 80-column screen.

After your parameters are displayed, enter LINE and press the return

key. Respond with the number 40 when the line length is requested. Next, enter TIME and, when requested, enter the three letters for your time zone (for example, PST for Pacific Standard Time). Finally, simply press the return key when prompted to change your setting. The system will inquire if these parameter selections are permanent or temporary. Enter PERM and press the return key. This action automatically returns you to the main menu.

Now, let's enter a message. When you see the Command prompt, enter CREATE. The system will respond with the prompt, TO:. If you were then to enter DSTONER, it would show that I am a registered user, and it would not require a further address. If you enter the name of anyone who is not a registered user, however, the system will request a street address, plus city, state and ZIP code.

Since you get to send one free message when you sign up with MCI, why not send yourself a letter? Enter your address, just as if you were addressing an envelope. After you enter the city, state and ZIP code, press the return key at the beginning of a line to indicate the end of the address entry.

Another TO: prompt will appear, and this often confuses newcomers. They think they have done something wrong entering the previous address information. This second prompt allows you to send the same message to any number of people. If you enter another name and address, that person will also get a copy of the letter. If you do not want to send the message to anyone else, press the return key in response to the prompt.

The system then will send the CC:, or Carbon Copy, prompt. Again, unless you want to send a carbon copy of the message to someone, simply press the return key.

Next comes the text entry. You can use the delete key if you make a mistake, and it will erase the error. You should not enter more than 80 characters without pressing the return key. If you do, you'll have to enter the Edit mode (see Help Edit) and select Format (see Help Format).

Once you have entered the message, type a slash (/) at the beginning of a line and press the return key. When you send the slash, the system will exit the message-entry program and send the Handling prompt, to which you may enter ONITE for overnight, or 4HOUR for courier delivery. Simply press the enter key for normal, non-expedited mail delivery. The Send prompt is next. Answer "no", even if you wish to send the message. You can send it later, after you have reviewed it. No charges are accrued until you answer "yes" and actually send the message.

At the Command prompt, enter READ DRAFT, and you'll see the message just as it was received by MCI. Since you pressed the return key at various places (to avoid sending more than 80 characters), your right margin will be ragged. You can send the letter this way or enter the Format program on the MCI computer. To do this, type FORMAT at the Command prompt. Use the Help files to learn about formatting, which is too complex to explain here.

Once you are satisfied with the letter you've typed, you can send it even if you answered "no" to the Send Message prompt. At the command line, enter SEND, and your letter will be transmitted.

Remember that you can always see what MCI has received from you by pressing the return key at the Handling prompt and by answering "no" to the Send prompt. Then type READ DRAFT to see the message as MCI has received it. If, after reviewing the message, you wish to send it, type SEND at the command line. When you check for your messages, simply type READ INBOX at the Command prompt. You will see the reply to your message.

Once you are finished experimenting or sending messages, enter EXIT at the Command prompt and disconnect the modem. The MCI system does not automatically disconnect you. If you do not switch off the modem, you will be returned to the entry point, where the system expects your ID and password. This can be handy if you are sending mail under several identifications. The disadvantage, of course, is that your telephone won't work if you don't switch from Data to Voice or disconnect the modem. R

Address all author correspondence to Donald L. Stoner, 6014 E. Mercer Way, Mercer Island, WA 98040.

Listing 1. *Automatic registration program for MCI Mail.*

```
10 REM ********************          :REM*76
20 REM AUTOMATIC REGISTRATION       :REM*224
30 REM PROGRAM FOR MCI MAIL         :REM*246
60 REM BY DONALD L. STONER          :REM*32
80 REM ********************          :REM*146
90 REM INITIALIZE VARIABLES         :REM*10
92 REM INITIALIZE VARIABLES         :REM*12
96 REM ********************          :REM*162
100 OPEN2,2,3,CHR$(38)+CHR$(96)     :REM*12
105 IFPEEK(58490)=42THEN130         :REM*113
110 POKE36879,29                    :REM*176
115 V=37136                         :REM*153
120 GOTO140                         :REM*114
130 POKE53280,7:POKE53281,12        :REM*170
135 V=56577                         :REM*179
140 POKEV+2,38                      :REM*106
145 K$=CHR$(20)                     :REM*171
150 J$=CHR$(187)                    :REM*242
155 CR$=CHR$(13)                    :REM*21
160 ID$="REGISTER"+CR$              :REM*246
165 PW$="REGISTER"+CR$              :REM*175
170 PH$="18003230905"               :REM*44
175 PRINTCHR$(14)+"{SHFT CLR}{2 CRSR DNs}{C
    TRL 1} {SHFT M}AKE CERTAIN YOUR MODEM I
    S CONNECTED"                    :REM*145
180 PRINT" AND SET FOR {SHFT O}RIGINATE, {S
    HFT D}ATA AND {SHFT F}ULL"      :REM*22
185 PRINT" THEN PRESS ANY KEY TO START.....
    ."                              :REM*153
190 GETA$:IFA$=""THEN190:           :REM*190
195 PRINT"{2 CRSR DNs} {SHFT W}AIT, INITIAL
    IZING PROGRAM...."              :REM*93
200 REM ****************************
                                    :REM*202
210 REM ASCII/CBM TRANSLATION TABLES :REM*8
220 REM ****************************
                                    :REM*222
225 DIM I%(255):DIMO%(255)          :REM*103
230 FORZ=32TO64                     :REM*204
235 O%(Z)=Z:NEXT                    :REM*157
240 O%(13)=13:O%(20)=8:O%(160)=32   :REM*142
245 FORZ=65TO90                     :REM*249
250 Y=Z+32:O%(Z)=Y:NEXT             :REM*234
255 FORZ=91TO95                     :REM*109
260 O%(Z)=Z:NEXT                    :REM*183
265 FORZ=193TO218                   :REM*170
270 Y=Z-128:O%(Z)=Y:NEXT            :REM*235
275 FORZ=0TO255                      :REM*2
280 Y=O%(Z):IFY<>0THENI%(Y)=Z       :REM*73
285 NEXT                            :REM*40
300 REM ********************        :REM*47
310 REM DIAL MCI MAIL NUMBER        :REM*249
320 REM ********************        :REM*67
325 FORRD=1TO10:P=PEEK(V)           :REM*246
330 PRINT"{SHFT CLR}{2 CRSR DNs}{2 SPACEs}{
    SHFT A}UTODIALING {SHFT M}{SHFT C}{SHFT
     I}{SHFT SPACE}{SHFT M}{SHFT A}{SHFT I}
    {SHFT L}{2 CRSR DNs}"           :REM*53
335 POKEV,P+16                      :REM*164
340 FORX=1TO1000:NEXT               :REM*123
345 FORPN=1TOLEN(PH$)               :REM*186
350 NN=VAL(MID$(PH$,PN,1))           :REM*9
355 GOSUB400                        :REM*70
360 NEXTPN                          :REM*217
365 FORDL=1TO1000                    :REM*34
370 A=PEEK(V)AND16:IFA=0THEN525      :REM*79
375 NEXTDL:POKEV,P-8:PRINT          :REM*214
380 PRINT"{2 CRSR DNs} {SHFT N}O {SHFT C}ON
    NECTION"                        :REM*13
```

```
 Autodialing MCI MAIL

 1  8  0  0  3  2  3  0  9  0  5

 No Connection
```

```
385 FORX=1TO75Ø:NEXTX:NEXTRD          :REM*2Ø8
39Ø PRINT"{2 CRSR DNs} {SHFT C}IRCUITS BUSY
    , TRY LATER"                      :REM*57
395 END                               :REM*142
4ØØ PRINTNN;:IFNN=ØTHENNN=1Ø           :REM*3
4Ø5 FORX=1TONN                        :REM*8Ø
41Ø POKEV,P-8:FORXX=1TO24:NEXTXX      :REM*111
415 POKEV,P+8:FORXX=1TO12:NEXTXX      :REM*176
42Ø NEXTX                             :REM*113
425 FORDL=1TO2ØØ:NEXT:RETURN          :REM*194
5ØØ REM **********************        :REM*55
51Ø REM AUTOSEND PASSWORD & ID        :REM*1Ø9
52Ø REM **********************        :REM*76
525 PRINT"{SHFT CLR} {SHFT C}ONNECTION TO {
    SHFT M}{SHFT C}{SHFT I} {SHFT M}{SHFT A
    }{SHFT I}{SHFT L} {SHFT E}STABLISHED"
                                      :REM*113
53Ø AS$=CR$:GOSUB93Ø                   :REM*24
535 GOSUB83Ø:GOSUB93Ø                 :REM*255
54Ø GOSUB83Ø:GOSUB93Ø                   :REM*4
545 PRINT"{CRSR DN} {SHFT S}ENDING IDENTIFI
    CATION"                           :REM*213
55Ø AS$=ID$:GOSUB83Ø                  :REM*158
555 GOSUB925                          :REM*247
56Ø PRINT"{CRSR DN} {SHFT S}ENDING PASSWORD
    "                                 :REM*248
565 AS$=PW$:GOSUB83Ø                  :REM*249
575 POKE667,255:POKE668,255           :REM*195
58Ø PRINT"{SHFT CLR}"+J$;             :REM*166
6ØØ REM **************************:REM*92
61Ø REM MAINLINE OF TERMINAL PROGRAM
                                      :REM*11Ø
62Ø REM **************************
                                      :REM*112
63Ø GET#2,A$:IFA$=""THEN7ØØ           :REM*194
64Ø A=I%(ASC(A$))                     :REM*218
65Ø PRINTK$+CHR$(A)+J$;                :REM*36
66Ø IFA=34THENPOKE212,Ø                :REM*92
67Ø GOTO63Ø                           :REM*178
7ØØ GETA$:IFA$=""THEN63Ø              :REM*162
71Ø REM:PRINTK$+A$+J$;:               :REM*128
72Ø PRINT#2,CHR$(O%(ASC(A$)));:GOTO63Ø
                                       :REM*38
8ØØ REM ******************           :REM*155
81Ø REM AUTOSEND SUBROUTINE            :REM*37
82Ø REM ******************           :REM*175
83Ø FORX=1TOLEN(AS$)                   :REM*19
84Ø T$=MID$(AS$,X,1)                   :REM*47
85Ø PRINT#2,CHR$(O%(ASC(T$)));        :REM*2Ø9
86Ø NEXTX                              :REM*43
87Ø RETURN                            :REM*163
9ØØ REM ***************               :REM*197
9Ø5 REM                               :REM*2Ø2
91Ø REM DELAY SUBROUTINE              :REM*149
915 REM                               :REM*212
92Ø REM ***************               :REM*217
925 GET#2,A$:IFA$=""THEN925             :REM*4
93Ø FORX=1TO2ØØØ:NEXT                  :REM*77
935 RETURN                            :REM*228
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Easy Assembly V

By WILLIAM B. SANDERS

Let's begin with something weird and useful. You're going to write a program that will load the values from a Basic program, store them in a safe place and then use them to bring back the Basic program erased by the New command. This will show you there is life after NEW and how to use LDA in the Absolute mode. Then, I'll discuss the C-64's memory with some key locations to use and some to avoid.

This month, we'll discuss what happens when you use the New command to erase a program, and what happens when you try to recover that program.

How NEW Works

When you enter the New command in Basic, you do not clear memory. Instead, you scramble a two-byte pointer in $801–$802 (memory locations 2049–2050). Your program then grabs those pointer values before the New command is executed, puts them somewhere safe in memory and then restores the pointers after the New command.

First, let's see what it takes to get the pointer values. You'll use LDA to load the values into the accumulator. You won't use the number sign (#), as you did in the Immediate mode; therefore, the assembler will know you are in the Absolute mode. In the Absolute mode, whatever is in an address is loaded into the accumulator. (You save the program using the filename GET.)

Get Pointer Routine

LABEL	OPCODE	OPERAND	COMMENT
	ORG	$C000	
	LDA	$801	
	STA	$C100	
	LDA	$802	
	STA	$C101	
	RTS		

ADDRS	OPCODE	OPERAND
49152	LDA	$801
49155	STA	$C100
49158	LDA	$802
49161	STA	$C101
49164	RTS	
49165	Q	

When you have a *short* Basic program in memory, the above routine will recover your lost program. On longer Basic programs, you need a longer routine. In future installments, I'll show you how to get everything you need to recover an entire program. For now, let's just see what you've accomplished.

- You loaded the value in location $801 into the accumulator.
- Whatever value was in $801 is now in the accumulator, and you stored it in location $C100.
- You then repeated the process for location $802, storing the value in $C101.
- You then returned from the subroutine (RTS).

Since $C100 and $C101 (memory locations 49408 and 49409, respectively) are out of the way of both the assembly language program and the Basic program, they're safe from alterations. If you enter SYS 49152 to access the machine language program after you've written the Basic program, those pointers will be preserved.

When you type NEW into the Basic program and rearrange the pointers in locations $801–$802, all you have to do is write a routine that will restore the pointers. Put the following routine at $C012 (49170), so that it can be loaded simultaneously with your first one. (Save the routine using the filename Restore.)

Restore Pointer Routine

LABEL	OPCODE	OPERAND	COMMENT
	ORG	$C012	New location
	LDA	$C100	
	STA	$801	
	LDA	$C101	
	STA	$802	
	RTS		

ADDRS	OPCODE	OPERAND
49170	LDA	$C100
49173	STA	$801
49176	LDA	$C101
49179	STA	$802
49182	RTS	
49183		

In the second routine, you simply reversed the process. You took the values from $C100–$C101 and placed them back into $801–$802. When you enter the SYS command, you should get your Basic program back. To test everything, follow the instructions below. (Note: The ".O" is a common extender to object code; your assembler may not have the ".O".)

1. LOAD "GET.O",8,1 (LOAD "GET 49152",8,1 on *RUN* Assembler.)
2. NEW <return>
3. LOAD "RECOVER.O",8,1 (LOAD "GET 49170",8,1 on *RUN* Assembler.)
4. NEW <return>
5. Enter the following Basic program.

```
10 PRINT CHR$(147)
20 FOR X = 65 TO 90
30 PRINT CHR$(X),
40 NEXT X
```

6. Run the program to make sure it works. List it and then enter SYS 49152 <return>. Your Get program will preserve the pointers.
7. Enter NEW <return>.
8. List your program to make sure it is not there.
9. Now, type SYS 49170 and then press the return key.
10. List your program and run it to see that it does work.

Now you've learned several lessons: how to use LDA in the Absolute mode; that the New command only resets pointers and does not clear memory; that machine language routines are not affected by the New command; and that more than one machine language routine can be placed in memory simultaneously.

If you run your recovered program a few times, some strange things happen because you didn't restore all the pointers scrambled by the New command. That's for a later date.

Using Your Memory

In its standard configuration, your C-64's memory can be divided into many different categories, but you'll be concerned with only three.

First, there are areas of memory not free for machine language program storage. These are areas reserved for the Basic ROM, the Kernal ROM and other built-in routines.

Second, there are those areas that can sometimes be used for storing machine language programs. For example, if you use a plug-in ROM (a cartridge), you cannot use $8000–$9FFF (32768–40959). However, if you do not use the cartridge, $8000 is a great place for your machine language programs. If you do not use a cassette, the cassette I/O buffer at $33C–$3FB (828–1019) is a nice place for short routines.

Finally, there are those areas that are almost always free for storing machine language programs. My favorite place is a 4K area beginning at $C000 (49152). At first you might think that 4K is not a lot of room for an assembly language program. But when you consider that three bytes is the maximum number used by a single instruction, you would need an assembly language program of over 1000 lines to fill it up! It is possible to reconfigure memory to use most of it for machine language programs, but, for the time being, just use the standard.

The first thing you have to learn about memory maps is what areas to avoid. Looking at the map below, you can see the only unconditionally free RAM is up in the $C000 area. You used that area in your programs to store your routines and values. You were able to put two routines up there simultaneously and store the reserved pointer values above both of the routines.

Sometimes, even $C000 will be a problem for storing machine language programs, because many assemblers use that area. (Most assemblers, remember, are written in assembly language.) For example, if you use the Merlin assembler and want to test out your routines while Merlin is in memory, you'll crash into the assembler/editor itself if your programs are in the $C000 area.

However, if you write your programs with Merlin and run the programs with Merlin out of memory, everything will work fine. This is why the Merlin assembler defaults to $8000 as the origin for machine language programs written in the Merlin editor. Then, using the SYS command, you can test programs with an origin of $8000 while Merlin is in memory in the monitor or in the Basic mode.

MEMORY MAP:
STANDARD CONFIGURATION

Top

$E000–$FFFF 57344–65535	Kernal ROM	8K
$D000–$DFFF 53248–57343	I/O or Character ROM	4K
$C000–$CFFF 49152–53247	Free RAM!!!!	4K
$A000–$BFFF 40960–49151	Basic ROM	8K
$8000–$9FFF 32768–40959	ROM Plug-In or Free RAM! Basic text storage also	8K
$0000–$7FFF 00000–32767	Lots of stuff— mostly Basic	32K

Bottom

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Also, since your *RUN* assembler is written in Basic, and Basic programs are stored beginning at $800 (2048), you can leave the assembler in memory and test without conflict the machine language routines it created in the $C000 area. If you want to know more about the memory in your C-64, take a look at *Mapping the Commodore 64*, by Sheldon Leemon.

Before I finish, let me say a few things about zero page and hexadecimal notations. At the very bottom of memory, in locations $0–$FF (0–255), is page 0, or zero page. This area is special to programmers with 8-bit processors, since its addresses are all eight-bits or fewer. It is possible to use certain nooks and crannies of zero page for speeding up your programs. However, in that area are a lot of pointers and other goodies that can turn your machine into a turnip if you're not careful.

For now, it's enough to be aware of zero page as a unique and important place in memory. As you go further, you'll begin exploring what's there and how to use it.

I have not yet discussed in detail what hexadecimal numbers are and their importance for machine language and assembly language programming. I'll be discussing that in future installments, but for now, it is important to get used to thinking in terms of hex. It is much easier to remember hex numbers in blocks than to remember decimal numbers. The memory map above is in nice even hex blocks, but the decimal groupings make no sense at all. As you become accustomed to programming in assembly language, you'll become more comfortable with hexadecimal numbers.

Questions and Answers

Q: In the April issue, you entered the following format to change screen colors:

```
A = 2 : POKE 53281,A
```

Wouldn't it be simpler to use POKE 53281,2 to do the same thing?

A: Yes, it would be simpler. However, I was illustrating how it is done in assembly language. You cannot directly enter a value into an address without first putting that value into a register. The variable "A" was a "pretend register" that was "loaded" with 2, which was then stored in the address 53281. Remember, you're not necessarily doing things in the most efficient way at first. You're doing them so that you can begin understanding how machine language and assembly language work.

Q: I'd like to see a memory map and know how to perform auto-functions and auto-loads. Also, I'd like to know where the program menu is stored, and see a list of all the common functions, such as JMP and LDA, with their numeric counterparts. Could you tell me what 255 stands for, how long a block is and whether or not I can change the Kernal? Finally, can disk formats be changed so that I can run Apple programs on my C-64, and how extensively can you program the chip in the disk drive?

A: I'll cover some of those questions in this series, and the more you ask, the more we can help out. Disk operations get very hairy, and you have to learn more basic elements of assembly language programming before I can even begin to explain the disk system.

To give you one answer now, 255 stands for the maximum amount that can be stored in an 8-bit register, such as those on your 6510. The value 255 is also known as $FF in hex and %11111111 in binary. (Actually, since you count from 0–255, you have 256 values in an 8-bit register or address.) Also, a memory map is provided for you in this month's installment.

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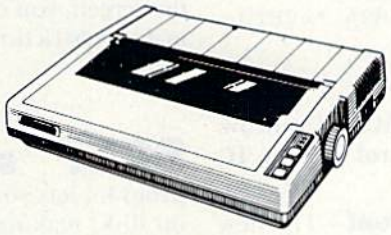

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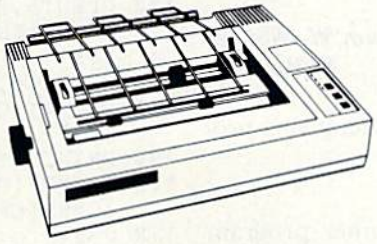

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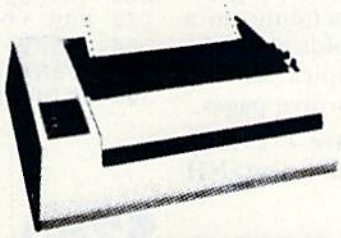

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From p. 10.

```
17 DATA 119,ØØ2,169,Ø44,141,12Ø,ØØ2,169
18 DATA ØØ2,133,198,24Ø,Ø18,2Ø1,Ø42,2Ø8
19 DATA Ø14,169,Ø2Ø,141,119,ØØ2,169,Ø13
2Ø DATA 141,12Ø,ØØ2,169,ØØ2,133,198,1Ø4
21 DATA Ø76,191,234
3Ø M=PEEK(55)+256*PEEK(56):A$=CHR$(17)
4Ø PRINT"WORKING":FORJ=9ØØTO982:READK
5Ø IFK=191ANDM>32768THENPOKEJ,49:NEXT
6Ø POKEJ,K:NEXT:PRINTCHR$(147)
7Ø PRINT"SYS9ØØ REASSIGNS THESE KEYS:"
8Ø PRINTA$"{LEFT ARROW}=DATA @=COMMA *=RETU
   RN"
9Ø PRINTA$"STOP/RESTORE KILLS THEM."
1ØØ SYS9ØØ:NEW
```

Mark Granzow
Carol Stream, IL

$25A Commodore 1571 caveat—The new 1571 disk drive has many marvelous features, not the least of which is its ability to write on both sides of the disk. But if you've been notching your floppies for two-sided recording on a single-sided drive, be careful. When you use the 1571 to reformat those disks (or any others), it will automatically reformat both sides, even if you've write-protected your extra notch. If you aren't aware of that aspect of double-sided recording, you could unexpectedly wipe out a flip side.

William W. Weaver
Saxton, PA

$25B Program load lock—If you save a program to disk using

SAVE "programname" + CHR$(34),8

it will appear in the directory like any other program named "programname." However, it can't be loaded unless you use the "programname" + CHR$(34) format. The result—nobody but you can load it!

Gary Wilson
Anthon, IA

$25C Estimating program lines—It's useful to be able to estimate the number of lines in a program when you have to print out a listing. Depending on a program's compactness, each disk block holds about 8–10 lines. Therefore, a program that occupies 30 disk blocks probably has 240–300 lines, or about five pages.

Peter T. Crosby
Claremont, NH

$25D Disk load and run—Here's a way to load and run a program from disk with the fewest typing strokes. Just type:

{CLR}{4 SPACEs} "filename",8: {HOME}{SHFT RUN/STOP}

The program comes up running.

John K. Newell
San Antonio, TX

**$25E Programmable Run key**—CHR$(131) is equivalent to the shifted run/stop key. That is, it automatically loads and runs a program. Unfortunately, you cannot print CHR$(131) and expect this result, but you can Poke it into the keyboard buffer as follows:

```
10 POKE 631,131 : POKE 198,1 : END : REM C-64 and VIC
10 POKE 1319,131 : POKE 239,1 : END : REM PLUS 4 and C-16
10 POKE 842,131 : POKE 208,1 : END : REM C-128.
```

When the line is executed, it will print the combination described above. If you're reasonably skilled at positioning on the screen, you can combine this and the previous trick to make a restriction-free programmable load and run.

Mark DuRussel
Midland, MI

$25F Sequential file reader—The following program lets you examine the contents of sequential files on disk, making it very useful in debugging. Before entering the name of the file you want to inspect, be sure that that file is on the disk in your drive. Then enter its name and watch the screen as the program steps through your file.

Use the space bar to advance through the file or press any other key to terminate the program. When you reach the end of the file, the program terminates automatically.

```
1ØØ REM SEQ FILE READER-LOUIS F. SANDER
11Ø OPEN15,8,15
12Ø PRINT:INPUT"{SHFT CLR}FILENAME TO READ"
   ;F$
13Ø OPEN2,8,2,F$+",S,R":PRINT:GOSUB28Ø
14Ø PRINT"{CRSR DN}HIT SPACE TO SEE NEXT BY
   TE,"
15Ø PRINT"HIT ANY OTHER KEY TO QUIT."
16Ø PRINT"{CRSR DN}{CTRL 9}BYTE#{2 CRSR RTs
   }CHR${CRSR RT}ASCII"
17Ø J=J+1
18Ø GET#2,A$:A$=LEFT$(A$+CHR$(Ø),1)
19Ø A=ASC(A$):B$=A$
2ØØ IFA$<CHR$(32)THENB$="{CRSR LF}N/A"
21Ø IFA$>CHR$(127)THENIFA$<CHR$(16Ø)THENB$=
   "{CRSR LF}N/A"
22Ø PRINTTAB(3);J;TAB(7);A;TAB(14);B$
23Ø IFST>19THEN26Ø
24Ø GETC$:IFC$=""THEN24Ø
25Ø IFC$=CHR$(32)THEN17Ø
26Ø CLOSE2:CLOSE15:END
27Ø REM ** DISK ERROR CHECK
28Ø INPUT#15,EN,EM$,ET,ES
29Ø IFEN=ØTHENRETURN
3ØØ PRINTEN;EM$;ET;ES:GOTO26Ø
```

Louis F. Sander
Pittsburgh, PA

$260 Easy Script directories—To get hard copies of a group of disk directories, load Easy Script, then go to Disk mode by pressing f4. Put the first disk in the drive and type +$0, which will put its directory into the text section. For the next disk, move the cursor to the bottom of the first listing, then repeat the above steps. Continue until all directories have been added to the text section, then print them out just as you would any document.

With this method, all of Easy Script's editing and formatting commands are available for your use. Also, for

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the benefit of those whose printers can't handle that mode, the disk headers are not printed in reverse field.

R.S. Michaelis
Marietta, OH

$261 Servicing the 1520 plotter—The Radio Shack CGP-115 printer-plotter is very similar to Commodore's own 1520. In fact, the paper transport, the pen transport and the electromechanical printing mechanism are identical on the two devices. Even though Radio Shack has discontinued the CGP-115, its operation and service manuals are still available, both under the same catalog number as the hardware, 26-1192. The operation manual doesn't relate to the Commodore plotter, but the service manual is very useful. It costs about $8, once you convince the store manager to order it from Texas.

By the way, don't forget that the pens and paper for the Radio Shack unit are directly compatible with the 1520.

Dave English
Orange, CA

$262 Serial bus extenders—Radio Shack sells all the parts needed to make extension cords for the Commodore serial bus. The cables you make can be male-male or male-female, depending on whether you want to use them by themselves or add length to existing cables. The male connector is #274-020, and the in-line female is #274-021. They sell for about $1 each.

The wire for your cables can be cannibalized from the #276-1978 Joystick Extension Cord, available for under $5. Remove the D-sub connectors from either end, and you're left with ten feet of thin, flexible nine-conductor cable.

When you make up your cables, be meticulously careful that you connect pin 1 to pin 1, pin 2 to pin 2, and so forth. It's easy to become confused, so I always double-check the tiny numbers molded into the body of the connector.

The joystick wire is not shielded, so your cables may increase the RF interference from your computer. There's also a chance that extra-long cables will cause timing problems on the bus. I've used two long, unshielded cables for several months, however, and I haven't had any problems.

Louis F. Sander
Pittsburgh, PA

$263 Connector protector—If you make a cable for your user port, the 24 exposed pins on its edge connector can be easily shorted by metal objects sitting behind the computer. If you don't like to give disaster a chance to strike, cover the bare pins with the backshell from a 37-pin, D-style connector. Any backshell to which the connector attaches by screws, such as the Cannon DC 51214-1, should work. The cover not only protects the pins, but it provides a handle for inserting and removing the user-port connector.

Joel R. Robertson
Bonaire, GA

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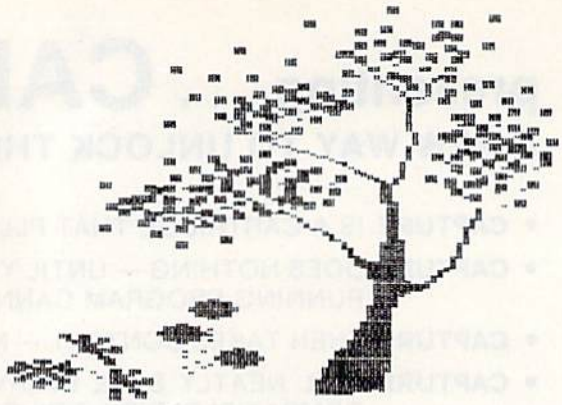
From p. 30.

```
127Ø DATA24Ø,3,76,115,194,169,1,141,4,192,1
     73,14,192,41,7,141,18,192,169    :REM*2
128Ø DATA7,56,237,18,192,141,18,192,24Ø,11,
     14,4,192,2Ø6,18,192,173,18,192:REM*237
129Ø DATA2Ø8,245,16Ø,Ø,173,2,192,133,251,17
     3,3,192,133,252,177,251,13,4,192,145
                                      :REM*147
13ØØ DATA251,173,17,192,24Ø,1,96,177,251,77
     ,4,192,145,251,96,162,4,32,2Ø1:REM*137
131Ø DATA255,169,8,32,21Ø,255,169,1,141,21,
     192,169,Ø,141,9,192,173,9,192 :REM*1Ø1
132Ø DATA1Ø,1Ø,1Ø,56,237,9,192,141,1Ø,192,1
     69,Ø,141,14,192,141,15,192,141:REM*141
133Ø DATA5,192,169,197,141,12,192,141,6,192
     ,169,1,141,4,192,173,14,192,41:REM*165
134Ø DATA7,141,18,192,169,7,56,237,18
                                      :REM*153
1341 DATA192,141,7,192,24Ø,8,14,4,192,2Ø6,7
     ,192,2Ø8                         :REM*154
135Ø DATA248,169,7,141,8,192,173,1Ø,192,141
     ,16,192,169,1,141,13,192,76,77 :REM*27
136Ø DATA193,173,2,192,133,251,173,3,192,13
     3,252,16Ø,Ø,177,251,45,4,192    :REM*39
137Ø DATA24Ø,33,173,16,192,56,237,1Ø,192,14
     1,18,192,24Ø,11,14,13,192,2Ø6  :REM*99
138Ø DATA18,192,173,18,192,2Ø8,245,173,13,1
     92,24,1Ø9,11,192,141,11,192,238,16
                                      :REM*2Ø5
139Ø DATA192,2Ø6,8,192,173,8,192,24Ø,3,76,1
     Ø7,194,173,14,192,133,251,173  :REM*25
14ØØ DATA12,192,133,252,16Ø,Ø,169,128,24,1Ø
     9,11,192,145,251,169,Ø,141,11 :REM*143
141Ø DATA192,238,14,192,173,14,192,2Ø8,6,23
     8,15,192,238,12,192,173,15,192:REM*163
142Ø DATA24Ø,7,173,14,192,2Ø1,64,24Ø,3,76,6
     4,194,16Ø,Ø,173,5,192,133,251 :REM*1Ø5
143Ø DATA173,6,192,133,252,177,251,32,21Ø,2
     55,238,5,192,2Ø8,3,238,6,192,173,5
                                      :REM*131
144Ø DATA192,2Ø1,64,2Ø8,224,173,6,192,2Ø1,1
     98,2Ø8,217,169,13,32,21Ø,255  :REM*191
145Ø DATA238,9,192,173,9,192,2Ø1,29,24Ø,3,7
     6,32,194,96,169,1,141,8,192    :REM*233
146Ø DATA169,17,32,21Ø,255,169,62,32,21Ø,25
     5,2Ø6,8,192,32,228,255,2Ø1,Ø   :REM*135
147Ø DATA24Ø,249,2Ø1,13,24Ø,27,2Ø1,2Ø,24Ø,2
     35,2Ø1,157,24Ø,231,174,8,192,157,Ø
                                      :REM*159
148Ø DATA196,32,21Ø,255,238,8,192,173,8,192
     ,2Ø1,18,2Ø8,218,173,8,192,162 :REM*185
149Ø DATAØ,16Ø,196,32,189,255,169,5,162,8,1
     6Ø,1,32,186,255,173,19,192     :REM*219
15ØØ DATA24Ø,21,169,Ø,133,251,173,Ø,192,133
     ,252                             :REM*89
151Ø DATA24,1Ø5,31,168,162,63,169,251,32,21
     6,255,96,169,Ø,162,255,16Ø     :REM*2Ø7
152Ø DATA255,32,213,255,96            :REM*21
```

Listing 2. *GRADS program.*

```
1 REM "+++++ BIT MAP GRAPHIC DISPLAY SYSTEM
   - MAIN PROGRAM +++++"              :REM*251
2 POKE53281,Ø:PRINT"{CTRL 2}"        :REM*18Ø
3 POKE49152,32                       :REM*127
4 POKE49153,1                        :REM*52
9 GOTO6ØØ                            :REM*235
1Ø PRINT"{SHFT CLR}{CRSR DN} THIS PROGRAM G
   IVES YOU THE OPPORTUNITY"         :REM*116
11 PRINT" TO DEVELOPE CREATIVE GRAPHICS."
                                     :REM*157
12 PRINT" INITIALLY, YOUR DRAWINGS MAY LOOK
   {7 SPACEs}STRANGE, BUT DON'T GIVE UP."
                                     :REM*66
```



```
13 PRINT" DRAWING WITH YOUR COMPUTER IS MOR
   E{6 SPACEs}FUN THAN YOU CAN IMAGINE!"
                                     :REM*151
16 PRINT"{CRSR DN} NOTE: WHEN YOU WANT THE
   MENU, JUST"                       :REM*72
17 PRINT" PRESS THE 'M' KEY. MENU WILL APPE
   AR."                              :REM*15
19 PRINT"{CRSR DN} ************* MENU ****
   ************"                     :REM*47
2Ø PRINT" *{36 SPACEs}*"              :REM*6
21 PRINT" *{3 SPACEs}'S' - TO SAVE THE PRES
   ENT SCREEN *"                     :REM*199
22 PRINT" *{3 SPACEs}'P' - TO PRINT PRESENT
    SCREEN{4 SPACEs}*"               :REM*32
23 PRINT" *{3 SPACEs}'I' - INSTRUCTIONS (HO
   W TO USE){2 SPACEs}*"             :REM*113
24 PRINT" *{3 SPACEs}'N' - NEW SCREEN (ERAS
   E ALL){5 SPACEs}*"                :REM*68
25 PRINT" *{3 SPACEs}'B' - BACK TO PRESENT
   SCREEN{5 SPACEs}*"                :REM*131
26 PRINT" *{3 SPACEs}'L' - TO LOAD A NEW SC
   REEN{7 SPACEs}*"                  :REM*92
27 PRINT" *{3 SPACEs}'E' - END OF DRAWING{1
   3 SPACEs}*"                       :REM*169
28 PRINT" *{36 SPACEs}*"              :REM*14
29 PRINT" ********************************
   *****"                            :REM*181
3Ø PRINT"{CRSR DN} *** PRESS RETURN FOR THE
    NEXT PAGE ***"                   :REM*14
31 GETT$:IFT$=""THEN31               :REM*45
5Ø PRINT"{SHFT CLR}{CRSR DN} *** INSTRUCTIO
   NS ***"                           :REM*76
51 PRINT"{CRSR DN} ALL INFORMATION REQUIRED
    TO EXCUTE"                       :REM*1Ø9
52 PRINT" THIS PROGRAM IS DESCRIBED IN THE
   "                                 :REM*228
53 PRINT" ACCOMPANYING ARTICLE. CAREFULLY L
   OAD"                              :REM*17
54 PRINT" AND EXECUTE THE TWO PROGRAMS."
                                     :REM*232
55 PRINT" ONCE EXECUTED, A BIT-MAP SCREEN W
   ILL"                              :REM*253
56 PRINT" APPEAR. THE SCREEN WILL BE BLANK
   "                                 :REM*156
57 PRINT" UNTIL THE JOYSTICK IS MOVED WITH
   THE"                              :REM*55
58 PRINT" FIRE BUTTON PRESSED."      :REM*184
76 PRINT" YOU CAN ALSO ERASE DOTS BY PLOTTI
   NG"                               :REM*158
77 PRINT" BLANK DOTS OVER DOTS WHICH YOU WA
   NT"                               :REM*247
78 PRINT" TO ERASE. ERASE BY MOVING THE JOY
   STICK                             :REM*2Ø6
79 PRINT" WITHOUT PRESSING THE FIRE BUTTON.
   "                                 :REM*113
8Ø PRINT" WHENEVER YOU WANT TO KNOW WHERE Y
   OUR"                              :REM*212
```

→

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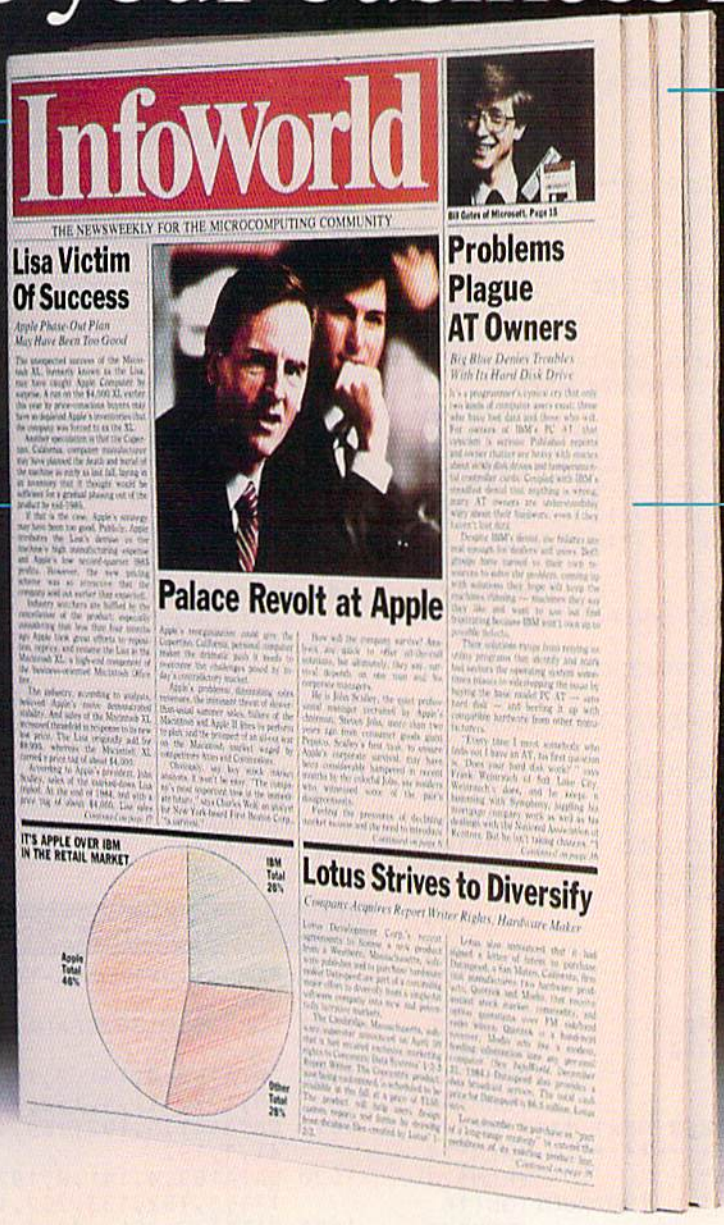
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THE NEWSWEEKLY FOR THE MICROCOMPUTING COMMUNITY

Lisa Victim Of Success

Apple Phase-Out Plan May Have Been Too Good

Problems Plague AT Owners

Big Blue Denies Troubles With Its Hard Disk Drive

Palace Revolt at Apple

IT'S APPLE OVER IBM IN THE RETAIL MARKET

IBM Total 26%

Apple Total 46%

Other Total 28%

Lotus Strives to Diversify

Company Acquires Report Writer Rights, Hardware Maker

Mainframes on Micros? Commercial fourth-generation mainframe programs are coming to Everyman's PC. How should it affect buying decisions, training, investments? InfoWorld knew what to expect months ago.

Giving Spies An Open Line? Electronic conferences via personal computer are easy to join, as well as profitable. But who owns what's spoken on the wire? The unwary could helplessly watch hard-earned business info merge with the public record. Thanks to our timely warnings, that trap won't catch InfoWorld readers.

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Listing 2 continued.

```
81 PRINT" DOT IS, STOP MOVING YOUR JOYSTICK
   AND"                                :REM*67
82 PRINT" HIT THE FIRE BUTTON. YOU'LL SEE A
   {7 SPACEs}BLINKING DOT."            :REM*134
84 PRINTSPC(18)"PRESS ANY KEY..."      :REM*210
85 GETT$:IFT$=""THEN85                 :REM*7
90 PRINT" THE WAY TO GET FAMILIAR WITH THIS
   "                                   :REM*74
91 PRINT" DRAWING SYSTEM IS TO PRACTICE."
                                       :REM*211
92 PRINT" GOOD LUCK !!"                :REM*54
97 PRINT" **** PRESS RETURN FOR MENU ****"
                                       :REM*145
98 GETT$:IFT$=""THEN98                 :REM*244
99 GOTO600                             :REM*69
100 PRINT"{SHFT CLR}{2 CRSR DNs}{2 SPACEs}D
    O YOU WANT TO CLEAN UP THIS SCREEN?""{C
    RSR DN}{4 SPACEs}YES OR NO?"       :REM*192
102 GETT$:IFT$=""THEN102               :REM*14
103 IFT$="Y"THENSYS49174:GOTO200       :REM*207
104 IFT$="N"THEN200                    :REM*64
105 GOTO102                            :REM*99
200 PRINT"{SHFT CLR}{3 CRSR DNs}{2 SPACEs}E
    NTER X-Y CORDINATES TO START WITH."
                                       :REM*246
201 PRINT"{CRSR DN}{2 SPACEs}X (0 TO 319) "
    ;:INPUTXI:IFXI<0ORXI>319THEN201:REM*123
211 PRINT"{CRSR DN}{2 SPACEs}Y (0 TO 199) "
    ;:INPUTY:IFY<0ORY>199THEN211       :REM*137
220 IFXI>255THENXL=XI-256:XH=1:GOTO222
                                       :REM*76
221 XL=XI:XH=0                         :REM*125
222 POKE49166,XL:POKE49167,XH:POKE49168,Y
                                       :REM*14
230 PRINT"{2 CRSR DNs}{2 SPACEs}ENTER THE D
    RAWING SPEED."                     :REM*174
231 PRINT"{CRSR DN}{5 SPACEs}1 FOR SLOW"
                                       :REM*171
232 PRINT"{5 SPACEs}2 FOR MED."        :REM*56
233 PRINT"{5 SPACEs}3 FOR FAST"        :REM*109
235 GETS$:IFS$=""THEN235               :REM*107
236 IFS$="1"THENSP=100:GOTO300         :REM*196
237 IFS$="2"THENSP=30:GOTO300          :REM*31
238 IFS$="3"THENSP=1:GOTO300           :REM*170
239 GOTO235                            :REM*129
300 SYS49228                           :REM*203
310 SYS49278                           :REM*23
400 SYS49312                           :REM*13
410 IFPEEK(49172)=1THEN500             :REM*65
420 FORI=0TOSP:NEXT:GOTO400            :REM*221
500 SYS49295                           :REM*211
510 POKE49172,0                        :REM*45
600 PRINT"{SHFT CLR}{5 CRSR DNs} **********
    * MENU OF GRADS ***********"       :REM*14
601 PRINT" *{36 SPACEs}*"              :REM*77
602 PRINT" *{3 SPACEs}'I' - INSTRUCTION{16
    SPACEs}*"                          :REM*76
603 PRINT" *{3 SPACEs}'E' - END OF DRAWING{
    13 SPACEs}*"                       :REM*235
604 PRINT" *{3 SPACEs}'N' - NEW SCREEN (ERA
    SE ALL){5 SPACEs}*"                :REM*138
605 PRINT" *{3 SPACEs}'B' - BACK TO PRESENT
     SCREEN{5 SPACEs}*"                :REM*201
606 PRINT" *{3 SPACEs}'S' - SAVING A PRESEN
    T SCREEN{4 SPACEs}*"               :REM*108
607 PRINT" *{3 SPACEs}'L' - LOADING A NEW S
    CREEN{7 SPACEs}*"                  :REM*193
608 PRINT" *{3 SPACEs}'P' - PRINTING A PRES
    ENT SCREEN{2 SPACEs}*"             :REM*232
609 PRINT" *{36 SPACEs}*"              :REM*85
610 PRINT" ********************************
    ******"                             :REM*252
620 PRINT"{2 CRSR DNs}{5 SPACEs}SELECT ONE
    OF THE ABOVE LETTERS"              :REM*96
621 GETT$:IFT$=""THEN621               :REM*181
622 IFT$="I"THEN10                     :REM*188
623 IFT$="E"THENEND                    :REM*119
624 IFT$="N"THEN100                    :REM*70
625 IFT$="B"THEN300                    :REM*73
626 IFT$="S"THENPOKE49171,1:GOTO800:REM*248
627 IFT$="L"THENPOKE49171,0:GOTO802:REM*243
628 IFT$="P"THEN700                    :REM*98
629 GOTO621                            :REM*153
700 PRINT"{SHFT CLR}{CRSR DN}{2 SPACEs}PRIN
    TING MODE"                         :REM*144
701 PRINT"{5 CRSR DNs}{9 SPACEs}READY FOR P
    RINTING?"                          :REM*139
702 PRINT"{CRSR DN}{9 SPACEs}IF READY, PRES
    S 'P'."                            :REM*16
703 PRINT"{CRSR DN}{9 SPACEs}'M' FOR MENU."
                                       :REM*157
710 GETT$:IFT$=""THEN710               :REM*110
712 IFT$="P"THEN730                    :REM*206
713 IFT$="M"THEN600                    :REM*49
714 GOTO710                            :REM*198
730 PRINT"{SHFT CLR}{3 CRSR DNs}{5 SPACEs}P
    RINTING....."                      :REM*32
731 OPEN4,4                            :REM*69
732 SYS49676                           :REM*62
733 PRINT#4:CLOSE4                     :REM*169
734 GOTO600                            :REM*194
800 PRINT"{SHFT CLR}{CRSR DN}{2 SPACEs}SAVI
    NG MODE":GOTO803                   :REM*51
802 PRINT"{SHFT CLR}{CRSR DN}{2 SPACEs}LOAD
    ING MODE"                          :REM*173
803 PRINT"{5 CRSR DNs}{5 SPACEs}IS YOUR DIS
    K DRIVE READY?"                    :REM*88
804 PRINT"{CRSR DN}{5 SPACEs}IF READY, PRES
    S RETURN."                         :REM*221
805 PRINT"{CRSR DN}{5 SPACEs}'M' FOR MENU."
                                       :REM*2
810 GETT$:IFT$=""THEN810               :REM*245
811 IFASC(T$)=13THEN820                :REM*48
812 IFT$="M"THEN600                    :REM*149
813 GOTO810                            :REM*50
820 PRINT"{2 CRSR DNs}{5 SPACEs}ENTER A SCR
    EEN NAME."                         :REM*9
822 SYS49957                           :REM*251
830 GOTO600                            :REM*35
```

Listing 3. *FT/DATA program.*

```
1600 REM +++ FT/DATA-KOALA FILTER MACHINE C
     ODE                               :REM*60
1601 FORI=0TO186:READA:POKE52028+I,A:NEXT
                                       :REM*5
1602 DATA169,0,141,2,192,169,96,141,3,192,1
     69,192,141,4,192,169,48           :REM*198
1610 DATA141,5,192,169,12,141,6,192,169,3,1
     41,7,192                          :REM*238
1620 DATA169,4,141,8,192,173,2,192,133,251,
     173,3,192,133,252,160,0           :REM*142
1630 DATA177,251,208,4,76,121,196,138,24,74
     ,176,7,74,176,5,170,76,113,196:REM*236
1640 DATA74,170,172,8,192,136,185,4,192,160
     ,0,17,251,145,251,206,8,192       :REM*188
1650 DATA173,8,192,208,221,238,2,192,208,3,
     238,3,192,173,2,192,201,64,208,182
                                       :REM*56
1660 DATA173,3,192,201,127,208,175,96
                                       :REM*22
1670 DATA169,0,141,2,192,141,4,192,169,32,1
     41,3,192,169,96,141,5,192,160,0
                                       :REM*150
1680 DATA173,4,192,133,251,173,5,192,133,25
     2,177,251,170,173,2,192,133,251:REM*62
1690 DATA173,3,192,133,252,138,145,251,238,
     2,192,238,4,192,208,6,238,3,192
                                       :REM*198
1700 DATA238,5,192,173,2,192,201,64,208,207
     ,173,3,192,201,63,208,200,96      :REM*114
```

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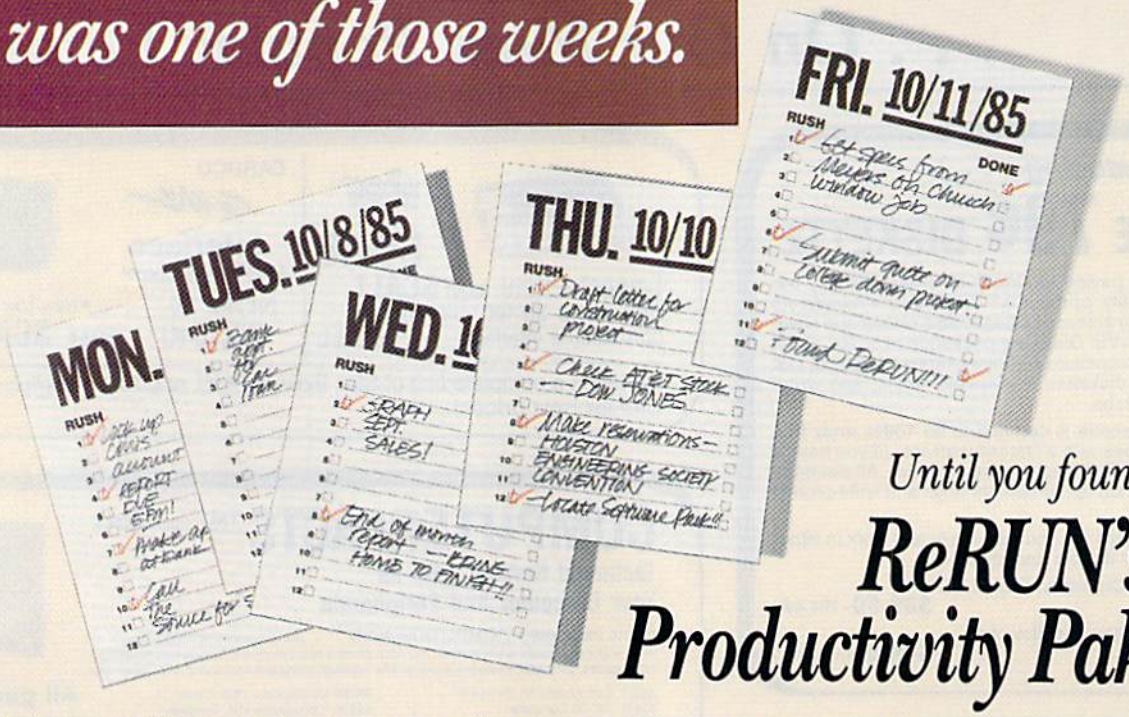

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Programmed by Jim Drew

Program	Star-Dos	Reg. Load	Mach 5	Fast Load	MAGNUM LOAD
Pitstop II	?	144 sec.	43 sec.	41 sec.	**31 sec.**
Music Shop	?	105 sec.	105 sec.*	105*	**21 sec.**
Hitchhiker's Guide to the Galaxy	?	70 sec.	70 sec.*	N.G.**	**68 sec.**
On-field Football	?	159 sec.	66 sec.	63 sec.	**56 sec.**
EASY FINANCE I	?	58 sec.	13 sec.	13 sec.	**11 sec.**

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*Will not fast load-defaulted back to regular load.
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DISKETTE MATCHER (compare sectors)
UNSCRATCH A FILE (recover file)
VIEW BAM (block allocation map)
1541 READ/WRITE TEST
½ TRACK READER
HEADER READER (display disk header)
SYNC MAKER
DEVICE NUMBER CHANGE (disk drive)
ELECTRONIC ARTS BACKUP
DRIVE MON (disk drive m/1 monitor)
DISKETTE FILE LOG (start-end address)
WRITE-PROTECT SENSOR TEST
REPAIR A TRACK (recover data)
FAST FORMAT (10 seconds)
½ TRACK FORMATTER

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COPY $A000 -$FFFF (under ROMS)
DISPLAY G.C.R. (All sector data)
UN-WRITE PROTECT (diskette)
UNNEW PROGRAM
WEDGE-$8000
SMOOTH SCROLL (messages up screen)
KOALA DUMP (koala pad screen dump)
DISK MANIPULATION SYSTEM
DISK ERASER (20 second clean wipe)
SPLIT SCREEN (TWO screen colors)
DISK PROTECTION SYSTEM (stops copies)
WRITE PROTECT (diskette)
BOOT MAKER (autoboot BASIC programs)
WEDGE-$C000
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9—WRITE OPENING MESSAGE
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11-CYCLE LOG
12-READ DOWNLOAD FILE
13-SCRATCH DOWNLOAD FILE
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From p. 40.

```
22Ø Y=1:GETB$:IFB$="+"THENY=-1:GOTO24Ø
                                        :REM*7Ø
225 IFB$=CHR$(13)THEN55                 :REM*51
23Ø IFVAL(B$)>ØANDVAL(B$)<4THENA$=B$:GOTO22
    Ø                                   :REM*186
235 IFB$<>"-"THEN22Ø                    :REM*45
24Ø X=VAL(A$):IFX=>2THENX=5             :REM*142
245 IFX=1THENX=3                        :REM*1Ø1
25Ø IFX=ØTHENX=1                        :REM*7Ø
255 POKEV+X,PEEK(V+X)+Y:GOTO22Ø         :REM*7
26Ø POKE198,Ø:INPUT"{SHFT CLR}{2 CRSR DNs}{
    5 CRSR RTs}NAME OF SPRITE";N$       :REM*1Ø7
265 PRINT"{2 CRSR DNs}DATA TO {CTRL 9}S{CTR
    L Ø}CREEN, {CTRL 9}P{CTRL Ø}RINTER, OR
    {CTRL 9}D{CTRL Ø}ISK"               :REM*82
27Ø GETP$:IFP$="S"THEN315               :REM*7
275 IFP$="D"THEN33Ø                     :REM*226
28Ø IFP$<>"P"THEN27Ø                    :REM*61
285 OPEN3,4:CMD3                        :REM*14
29Ø PRINT,,,,N$:PRINT:PRINT             :REM*2Ø9
295 FORT=12288 TO 1235Ø STEP1Ø          :REM*72
3ØØ FORI=ØTO9                           :REM*117
3Ø5 PRINTPEEK(T+I)",";:NEXT:PRINT:PRINT:NEX
    T                                   :REM*96
31Ø PRINT#3:CLOSE3:GOTO55               :REM*157
315 PRINT"{SHFT CLR}":FORT=12288 TO 1235Ø S
    TEP 3                               :REM*46
32Ø PRINT,PEEK(T),PEEK(T+1),PEEK(T+2):NEXT
                                        :REM*221
325 END                                 :REM*72
33Ø INPUT"{2 CRSR DNs}{CTRL 9}S{CTRL Ø}AVE
    OR {CTRL 9}L{CTRL Ø}OAD";S$         :REM*2Ø1
335 IFS$="L"THEN355                     :REM*154
34Ø OPEN1,8,1,N$                        :REM*35
345 SYS65418:POKE78Ø,251:POKE251,Ø:POKE252,
    48:POKE781,192:POKE782,48:SYS65496
                                        :REM*184
35Ø CLOSE1:GOTO1Ø                       :REM*165
355 SYS65418:LOADN$,8,1                 :REM*254
36Ø POKE198,Ø                           :REM*17
365 EX=32:H=2:V=53248:INPUT"{SHFT CLR}MULTI
     COLOR 1 ( *)";M1                   :REM*2Ø2
37Ø INPUT"MULTI COLOR 2 (**)";M2        :REM*191
375 INPUT"SPRITE COLOR{2 SPACEs}(* )";M3
                                        :REM*96
38Ø POKEV+28,7:POKEV+37,M1:POKEV+38,M2
                                        :REM*215
385 GOTO35                              :REM*15Ø
39Ø X=X-H:IFX<1ØTHENX=EX                :REM*157
395 IFZZ=1THENX=X-H:Z=6Ø:RETURN         :REM*212
4ØØ GOSUB45Ø:RETURN                     :REM*153
4Ø5 IFZZ=1THENZ=6Ø:RETURN               :REM*66
41Ø X=X+H:IFX>EXTHENX=1Ø                :REM*71
415 GOSUB45Ø:RETURN                     :REM*168
42Ø Y=Y+1:IFY>21THENY=1                 :REM*119
425 IFZZ=1THENX=X-H:Z=6Ø:RETURN         :REM*242
43Ø GOSUB45Ø:RETURN                     :REM*183
435 Y=Y-1:IFY<1THENY=21                 :REM*9Ø
44Ø IFZZ=1THENX=X-H:Z=6Ø:RETURN          :REM*1
445 GOSUB45Ø:RETURN                     :REM*198
45Ø IFH=2THEN47Ø                        :REM*65
455 POKESC,PEEK(E):SC=Y*4Ø+X+SR         :REM*54
46Ø POKEE,PEEK(SC):POKESC,1Ø2           :REM*51
465 CR=16Ø:RETURN                       :REM*194
47Ø CV=SC+CC                            :REM*29
475 POKESC,PEEK(E):POKESC+1,PEEK(E+1):REM*4
48Ø POKECV,PEEK(E+2):POKECV+1,PEEK(E+2)
                                        :REM*51
485 SC=Y*4Ø+X+SR                        :REM*17Ø
49Ø POKEE,PEEK(SC):POKEE+1,PEEK(SC+1)
                                        :REM*27
495 POKEE+2,PEEK(SC+CC)                 :REM*238
5ØØ POKESC,1Ø2:POKESC+1,1Ø2             :REM*239
5Ø5 RETURN                              :REM*52
51Ø IFH=2THEN56Ø                        :REM*251
515 IFZZ=1THEN53Ø                       :REM*125
52Ø IFPEEK(E)=16ØTHENCR=32              :REM*174
525 IFPEEK(E)<>16ØTHENCR=16Ø            :REM*61
53Ø POKESC,CR                           :REM*192
535 POKEE,CR:X=X+1:IFX>33THENX=1Ø       :REM*191
54Ø GOSUB45Ø:RETURN                     :REM*38
545 PRINT"{SHFT CLR}{CTRL 9} RETURN {CTRL Ø
    } TO EXIT"                          :REM*47
55Ø POKEV,(PEEK(V)+1)AND255:IFPEEK(197)<>1T
    HEN55Ø                              :REM*54
555 GOTO35                              :REM*65
56Ø CR=16Ø:CS=224:CV=SC+CC              :REM*84
565 IFZZ=1THEN575                       :REM*2Ø3
57Ø IFPEEK(E)<>32THENCR=32:POKESC,CR:POKESC
    +1,CR:R=32:GOTO59Ø                  :REM*44
575 IFQ=1THENR=CR:CR=CS:POKESC,CR:POKESC+1,
    R:POKECV,M1:POKECV+1,M1:POKEE+2,M1
                                        :REM*139
58Ø IFQ=2THENR=CS:POKESC,CR:POKESC+1,R:POKE
    CV,M3:POKECV+1,M3:POKEE+2,M3        :REM*2Ø4
585 IFQ=3THENR=CR:POKESC,CR:POKESC+1,CR:POK
    ECV,M2:POKECV+1,M2:POKEE+2,M2       :REM*249
59Ø POKEE,CR:POKEE+1,R:X=X+2:IFX>32THENX=1Ø
                                        :REM*2ØØ
595 GOSUB47Ø:RETURN                     :REM*125
6ØØ DATA 12Ø, 169, 13, 141, 2Ø, 3, 169, 192
    , 141, 21, 3, 88, 96, 165, 8Ø       :REM*122
6Ø5 DATA{2 SPACEs}2Ø1, 48, 2Ø8, 73, 169, 12
    , 133, 8Ø, 173, 141, 2, 2Ø1, 1, 24Ø, 32
                                        :REM*155
61Ø DATA{2 SPACEs}234, 165, 197, 2Ø1, 3, 2Ø
    8, 3, 32, 141, 192, 2Ø1, 6, 2Ø8, 3, 32
                                        :REM*54
615 DATA{2 SPACEs}118, 192, 2Ø1, 4, 2Ø8, 3,
     32, 117, 193, 2Ø1, 5, 24Ø, 48, 76, 1
                                        :REM*97
62Ø DATA{2 SPACEs}194, 234, 165, 197, 2Ø1,
    4, 2Ø8, 3, 32, 147, 193, 2Ø1, 6, 2Ø8, 3
                                        :REM*21Ø
625 DATA{2 SPACEs}32, 51, 193, 2Ø1, 5, 2Ø8,
     3, 32, 97, 192, 2Ø1, 3, 2Ø8, 3, 32
                                        :REM*137
63Ø DATA{2 SPACEs}182, 194, 23Ø, 8Ø, 76, 49
    , 234, 173, 29, 2Ø8, 73, 1, 141, 29, 2Ø
    8                                   :REM*1Ø2
635 DATA{2 SPACEs}96, 173, 23, 2Ø8, 73, 1,
    141, 23, 2Ø8, 76, 49, 234, 234, 173, 24
    8                                   :REM*247
64Ø DATA{2 SPACEs}7, 2Ø1, 192, 24Ø, 6, 2Ø6,
     248, 7, 76, 134, 192, 238, 248, 7, 169
                                        :REM*54
645 DATA{2 SPACEs}32, 133, 8Ø, 96, 234, 234
    , 162, Ø, 16Ø, Ø, 132, 253, 169, 5Ø, 13
    3                                   :REM*165
65Ø DATA{2 SPACEs}251, 169, 4, 133, 252, 17
    7, 251, 2Ø1, 16Ø, 2Ø8, 4, 56, 76, 166,
    192                                 :REM*182
655 DATA{2 SPACEs}24, 62, Ø, 48, 23Ø, 253,
    165, 253, 2Ø1, 8, 2Ø8, 9, 169, Ø, 133
                                        :REM*237
66Ø DATA{2 SPACEs}253, 232, 224, 63, 24Ø, 2
    3, 2ØØ, 192, 24, 2Ø8, 22Ø, 24, 165, 251
    ,1Ø5                                :REM*58
665 DATA{2 SPACEs}4Ø, 133, 251, 165, 252, 1
    Ø5, Ø, 133, 252, 16Ø, Ø, 76, 155, 192,
    96                                  :REM*249
67Ø DATA{2 SPACEs}162, 64, 189, 255, 47, 15
    7, 191, 48, 2Ø2, 2Ø8, 247, 162, Ø, 134,
     253                                :REM*22
675 DATA{2 SPACEs}16Ø, Ø, 169, 5Ø, 133, 251
    , 169, 4, 133, 252, 189, 192, 48, 41, 1
    28                                  :REM*49
68Ø DATA{2 SPACEs}24Ø, 21, 169, 16Ø, 145, 2
    51, 62, 192, 48, 2ØØ, 32, 12, 193, 224,
     63                                 :REM*2Ø4
```


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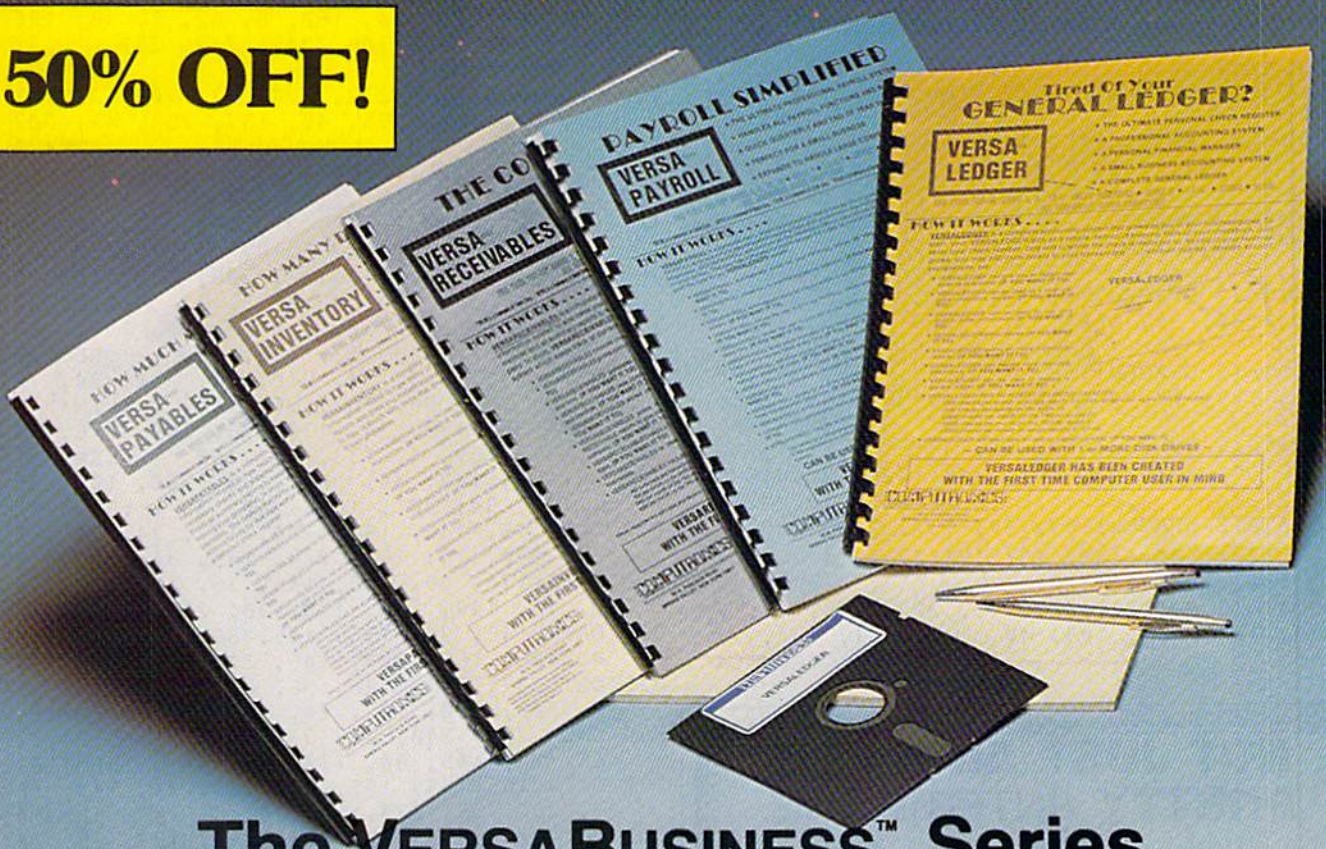

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Circle 9 on Reader Service card.

Listing 1 continued.

```
685 DATA{2 SPACEs}24Ø, 2Ø, 234, 234, 234, 7
    6, 235, 192, 169, 32, 76, 244, 192, 23Ø
    , 253                                  :REM*187
69Ø DATA{2 SPACEs}165, 253, 2Ø1, 8, 24Ø, 1,
     96, 169, Ø, 133, 253, 232, 234, 192, 2
    4                                      :REM*184
695 DATA{2 SPACEs}24Ø, 4, 234, 76, 2Ø, 193,
     16Ø, Ø, 24, 165, 251, 1Ø5, 4Ø, 133, 25
    1                                      :REM*125
7ØØ DATA{2 SPACEs}165, 252, 1Ø5, Ø, 133, 25
    2, 96, 173, 248, 7, 2Ø1, 192, 24Ø, 6, 2
    Ø6                                     :REM*156
7Ø5 DATA{2 SPACEs}248, 7, 76, 7Ø, 193, 238,
     248, 7, 238, 248, 7, 169, 32, 133, 8Ø
                                           :REM*1Ø5
71Ø DATA{2 SPACEs}96, 169, Ø, 133, 251, 169
    , 4, 133, 252, 16Ø, Ø, 177, 251, 2Ø1, 3
    2                                      :REM*18Ø
715 DATA{2 SPACEs}2Ø8, 21, 145, 251, 2ØØ, 2
    Ø8, 245, 23Ø, 252, 165, 252, 2Ø1, 7, 24
    Ø, 3                                   :REM*173
72Ø DATA{2 SPACEs}76, 85, 193, 192, 224, 2Ø
    8, 23Ø, 96, 169, 32, 76, 91, 193, 162,
    64                                     :REM*126
725 DATA{2 SPACEs}189, 127, 48, 157, 191, 4
    8, 189, 63, 48, 157, 127, 48, 189, 255,
     47                                    :REM*2Ø5
73Ø DATA{2 SPACEs}157, 63, 48, 189, 191, 48
    , 157, 255, 47, 2Ø2, 2Ø8, 229, 96, 162,
     21                                    :REM*242
735 DATA{2 SPACEs}169, 49, 133, 251, 169, 4
    , 133, 252, 16Ø, 24, 169, 32, 145, 251,
     136                                   :REM*49
74Ø DATA{2 SPACEs}2Ø8, 251, 2Ø2, 24Ø, 14, 2
    4, 165, 251, 1Ø5, 4Ø, 133, 251, 144, 23
    5                                      :REM*54
745 DATA{2 SPACEs}23Ø, 252, 76, 157, 193, 9
    6                                      :REM*1
75Ø DATA{2 SPACEs}24, 162, Ø, 16Ø, 8, 62, Ø
    , 48, 126, 2, 49, 136, 2Ø8, 247:REM*2Ø8
755 DATA{2 SPACEs}232, 232, 232, 224, 63, 2
    Ø8, 238, 162, Ø, 16Ø, 8, 62, 2, 48
                                           :REM*117
76Ø DATA{2 SPACEs}126, Ø, 49, 136, 2Ø8, 247
    , 232, 232, 232, 224, 63, 2Ø8, 238, 162
                                           :REM*2Ø8
765 DATA{2 SPACEs}Ø, 16Ø, 8, 62, 1, 48, 126
    , 1, 49, 136, 2Ø8, 247, 232, 232
                                           :REM*197
77Ø DATA{2 SPACEs}232, 224, 63, 2Ø8, 238, 1
    62, 64, 189, 255, 48, 157, 255, 47, 2Ø2
                                           :REM*73
775 DATA 2Ø8, 247, 96, 173, 141, 2, 2Ø1, 4,
     2Ø8, 3, 76, 194, 194, 2Ø1             :REM*1Ø4
78Ø DATA 2, 2Ø8, 3, 32, 21, 194, 76, 92, 19
    2, 162, 64, 189, 255, 47               :REM*245
785 DATA 157, 63, 49, 2Ø2, 2Ø8, 247, 169, 6
    3, 133, 34, 169, 49, 133, 35           :REM*224
79Ø DATA 162, 63, 16Ø, 3, 177, 34, 157, 255
    , 47, 2Ø2, 24Ø, 12, 136, 2Ø8           :REM*29
795 DATA 245, 23Ø, 34, 23Ø, 34, 23Ø, 34, 76
    , 42, 194, 96, 162, 21, 169            :REM*21Ø
8ØØ DATA 5Ø, 133, 34, 133, 36, 169, 216, 13
    3, 37, 169, 4, 133, 35, 16Ø            :REM*51
8Ø5 DATA Ø, 177, 34, 2Ø1, 16Ø, 24Ø, 1Ø, 2ØØ
    , 177, 34, 2Ø1, 16Ø, 24Ø, 36           :REM*252
81Ø DATA 76, 145, 194, 2ØØ, 177, 34, 2Ø1, 1
    6Ø, 24Ø, 15, 169, 224, 145, 34         :REM*71
815 DATA 173, 39, 2Ø8, 145, 36, 136, 145, 3
    6, 76, 146, 194, 173, 38, 2Ø8          :REM*14Ø
82Ø DATA 145, 36, 136, 145, 36, 76, 146, 19
    4, 136, 169, 224, 145, 34, 173         :REM*173
825 DATA 37, 2Ø8, 145, 36, 2ØØ, 145, 36, 13
    6, 2ØØ, 2ØØ, 192, 24, 2Ø8, 187         :REM*1Ø4
83Ø DATA 2Ø2, 24Ø, 26, 234, 234, 234, 24, 1
    65, 36, 1Ø5, 4Ø, 133, 36, 24           :REM*1Ø7
835 DATA 165, 34, 1Ø5, 4Ø, 133, 34, 144, 16
    3, 23Ø, 35, 23Ø, 37, 76, 81            :REM*4
84Ø DATA 194, 96, 32, 21Ø, 192, 173, 28, 2Ø
    8, 24Ø, 3, 32, 65, 194, 96             :REM*161
845 DATA 32, 184, 193, 76, 92, 192         :REM*88
```


Circle 60 on Reader Service card.

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Listing 2. *Sprite Artist demonstration program.*

```
1Ø  IFZ=1 THEN 1ØØ                         :REM*11Ø
2Ø  POKE5328Ø,1:POKE53281,1:PRINT"{SHFT CLR}
    "                                      :REM*68
3Ø  PRINT"GET SPRITE DATA FROM {CTRL 9}D{CTR
    L Ø}ISK, {CTRL 9}T{CTRL Ø}APE OR THIS {C
    TRL 9}L{CTRL Ø}ISTING?"                :REM*122
4Ø  Y=8:INPUTA$:IFA$="L" THEN 8Ø           :REM*22Ø
5Ø  IF A$="T"THEN Y=1                      :REM*54
6Ø  INPUT"NAME OF SPRITE";NS$              :REM*8Ø
7Ø  IFZ=Ø THEN Z=1:LOADNS$,Y,1             :REM*12
8Ø  INPUT"HOW MANY SPRITE SHAPES";H$:H=VAL(H
    $)                                     :REM*156
9Ø  FORT=12288 TO (T+H*64)-1:READA:POKET,A:N
    EXT                                    :REM*18
1ØØ V=53248:POKEV,1ØØ:POKEV+1,1ØØ          :REM*196
11Ø POKEV+16,Ø:POKEV+21,1:POKEV+39,6:REM*88
12Ø REM IF YOU'RE USING MULTICOLOR SPRITES
    DELETE THE FOLLOWING REM               :REM*54
13Ø REM POKEV+28,1:POKEV+37,4:POKEV+38,5
                                           :REM*42
14Ø POKE2Ø4Ø,192+X:X=X+1:IFX>2THENX=Ø
                                           :REM*9Ø
15Ø FORT=1TO2ØØ:NEXT:GOTO14Ø               :REM*2Ø4
1ØØØ REM START YOUR SPRITE DATA HERE:REM*63
```

Circle 61 on Reader Service card.

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From p. 48.

```
134Ø POKE183,LEN(F$):POKE187,238:POKE188,2:
     POKE186,8:POKE185,1                :REM*199
135Ø RETURN                             :REM*133
136Ø :                                  :REM*61
137Ø REM --------- SAVE SUB ------------
                                        :REM*211
138Ø :                                  :REM*81
139Ø SH=INT(S/256):SL=S-SH*256          :REM*27
14ØØ EH=INT(E/256):EL=E-EH*256          :REM*215
141Ø POKE251,SL:POKE252,SH              :REM*239
142Ø POKE78Ø,251:POKE781,EL:POKE782,EH
                                        :REM*233
143Ø SYS65496                           :REM*11
144Ø GOSUB71Ø:IFA=ØTHENRETURN           :REM*145
145Ø PRINT"{SHFT CLR}"DN$"{CRSR RT}DISK ERR
     OR "A;B$"{HOME}"                   :REM*149
146Ø GOSUB74Ø                           :REM*243
147Ø RETURN                             :REM*253
148Ø :                                  :REM*181
149Ø REM --------- LOAD SCREEN ---------
                                        :REM*87
15ØØ :                                  :REM*2Ø1
151Ø F1$="":F2$=""                      :REM*1Ø5
152Ø PRINT"{SHFT CLR}{CRSR DN}{CRSR RT}EXAC
     T SCREEN NAME";                    :REM*73
153Ø INPUTF1$:IFF1$=""THEN1ØØ          :REM*121
154Ø IFLEN(F1$)>14THEN152Ø              :REM*42
155Ø PRINT"{CRSR DN}{CRSR RT}LOAD COLOR TOO
     ? [Y/N]"                           :REM*44
156Ø GETA$:IFA$<>"Y"ANDA$<>"N"THEN156Ø
                                        :REM*244
157Ø FS=1:IFA$="Y"THENFS=2:F2$=F1$+".C"
                                        :REM*138
158Ø F$=F1$:GOSUB133Ø:POKE78Ø,Ø:SYS65493
                                        :REM*254
159Ø GOSUB71Ø:IFA=ØTHEN163Ø            :REM*254
16ØØ PRINTDN$"DISK ERROR"A;B$"{HOME}"
                                        :REM*44
161Ø GOSUB74Ø                           :REM*138
162Ø GOTO1ØØ                           :REM*2Ø
163Ø IFFS=2THENF$=F2$:GOSUB133Ø:POKE78Ø,Ø:S
     YS65493                            :REM*11Ø
164Ø GOSUB71Ø:IFA=ØTHEN169Ø            :REM*178
165Ø GOSUB86Ø                           :REM*218
166Ø PRINTDN$"COLOR FILE NOT LOADED{HOME}"
                                        :REM*78
167Ø GOSUB74Ø                           :REM*198
168Ø GOTO37Ø                            :REM*2Ø8
169Ø POKEBO,PEEK(56296):POKEBG,PEEK(56297)
                                        :REM*24
17ØØ GOSUB86Ø                           :REM*12
171Ø GOTO37Ø                            :REM*238
172Ø :                                  :REM*166
173Ø REM ------- LARGE TEXT ------------
                                        :REM*142
174Ø :                                  :REM*186
175Ø PRINT"{HOME}";                     :REM*152
176Ø GOSUB191Ø                          :REM*1Ø8
177Ø IFLEFT$(M$,1)="{LB.}"THENGOSUB86Ø:GOTO
     24Ø                                :REM*4
178Ø IFLEFT$(M$,1)="{LEFT ARROW}"THENM$=RIG
     HT$(M$,LEN(M$)-1):GOTO181Ø         :REM*92
179Ø ML=(4Ø-LEN(M$)*4)/2                :REM*46
18ØØ IFML>ØTHENFORI=1TOML:PRINT"{CRSR RT}";
     :NEXT                              :REM*15
181Ø FORI=1TOLEN(M$)                    :REM*99
182Ø A$=MID$(M$,I,1)                    :REM*191
183Ø A=ASC(A$+NL$)+64*(ASC(A$+NL$)>63)
                                        :REM*1Ø1
184Ø PRINTB$(A);:NEXT:PRINT"{3 CRSR DNs}"
                                        :REM*1Ø3
185Ø GETG$:IFG$=""THEN185Ø              :REM*173
186Ø IFG$="{LB.}"THENGOSUB86Ø:GOTO24Ø
                                        :REM*129
187Ø PRINT:GOTO176Ø                     :REM*1Ø1
188Ø :                                  :REM*71
189Ø REM ------- GET TEXT LINE ---------
                                        :REM*7
19ØØ :                                  :REM*91
191Ø M$="":PRINTDN$"{COMD +}{CRSR LF}";
                                        :REM*21
192Ø GETG$:IFG$=""THEN192Ø              :REM*179
193Ø IFASC(G$)>31ANDASC(G$)<96THENM$=M$+G$
                                        :REM*25
194Ø IFG$=CHR$(2Ø)ORG$=CHR$(157)THENM$=LEFT
     $(M$,LEN(M$)+1*(LEN(M$)>Ø))        :REM*197
195Ø IFG$<>CHR$(13)THENPRINT" {CRSR LF}"G$"
     {COMD +}{CRSR LF}";:GOTO192Ø       :REM*211
196Ø IFM$=""THENM$=" "                  :REM*143
197Ø PRINTDN$"{CRSR UP}":RETURN         :REM*2Ø1
198Ø B$(Ø)="{CRSR DN}"                  :REM*231
199Ø B$(1)="{CRSR RT}{CTRL 9}{SHFT LB.} {CO
     MD *}{CRSR DN}{3 CRSR LFs} {CRSR RT} {
     CRSR DN}{3 CRSR LFs} {COMD I} {CRSR DN
     }{3 CRSR LFs} {CRSR RT} {3 CRSR UPs}"
                                        :REM*131
2ØØØ B$(2)="{CRSR RT}{CTRL 9}{2 SPACEs}{COM
     D *}{CRSR DN}{3 CRSR LFs} {CRSR RT} {C
     RSR DN}{3 CRSR LFs} {COMD I} {CRSR DN}
     {3 CRSR LFs} {CTRL Ø}{COMD I}{CTRL 9}
     {3 CRSR UPs}"                      :REM*9
2Ø1Ø B$(3)="{CRSR RT}{CTRL 9}{3 SPACEs}{CRS
     R DN}{3 CRSR LFs} {CRSR RT}{COMD I}{CR
     SR DN}{3 CRSR LFs} {CRSR DN}{CRSR LF}
     {CTRL Ø}{COMD I}{CTRL 9} {3 CRSR UPs}"
                                        :REM*1Ø3
2Ø2Ø B$(4)="{CRSR RT}{CTRL 9}{2 SPACEs}{COM
     D *}{CRSR DN}{3 CRSR LFs} {CRSR RT} {C
     RSR DN}{3 CRSR LFs} {CRSR RT} {CRSR DN
     }{3 CRSR LFs} {CTRL Ø}{COMD I}{CTRL 9}
      {3 CRSR UPs}"                     :REM*71
2Ø3Ø B$(5)="{CRSR RT}{CTRL 9}{3 SPACEs}{CRS
     R DN}{3 CRSR LFs} {CRSR RT}{CRSR DN}{2
      CRSR LFs} {COMD I}{CRSR DN}{2 CRSR LF
     s} {CTRL Ø}{2 COMD Is}{3 CRSR UPs}"
                                        :REM*173
2Ø4Ø B$(6)="{CRSR RT}{CTRL 9}{3 SPACEs}{CRS
     R DN}{3 CRSR LFs} {CRSR RT}{CRSR DN}{2
      CRSR LFs} {COMD I}{CRSR DN}{2 CRSR LF
     s} {CTRL Ø}{2 SPACEs}{3 CRSR UPs}"
                                        :REM*245
2Ø5Ø B$(7)="{CRSR RT}{CTRL 9}{3 SPACEs}{CRS
     R DN}{3 CRSR LFs} {CRSR RT}{COMD I}{CR
     SR DN}{3 CRSR LFs} {CTRL Ø}{COMD D}{CO
     MD I}{CRSR DN}{3 CRSR LFs}{CTRL 9} {CT
     RL Ø}{COMD I}{CTRL 9} {3 CRSR UPs}"
                                        :REM*36
2Ø6Ø B$(8)="{CRSR RT}{CTRL 9} {CRSR RT} {CR
     SR DN}{3 CRSR LFs} {CRSR RT} {CRSR DN}
     {3 CRSR LFs} {COMD I} {CRSR DN}{3 CRSR
      LFs} {CRSR RT} {3 CRSR UPs}"      :REM*56
2Ø7Ø B$(9)="{CRSR RT}{CTRL 9}{COMD K}{CTRL
     Ø}{COMD K}{CRSR DN}{2 CRSR LFs}{CTRL 9
     }{COMD K}{CTRL Ø}{COMD K}{CRSR DN}{2 C
     RSR LFs}{CTRL 9}{COMD K}{CTRL Ø}{COMD
     K}{CRSR DN}{2 CRSR LFs}{CTRL 9}{COMD K
     }{CTRL Ø}{COMD K}{3 CRSR UPs}":REM*156
2Ø8Ø B$(1Ø)="{CRSR RT}{CTRL 9}{2 CRSR RTs}
     {CRSR DN}{CRSR LF} {CRSR DN}{CRSR LF}
     {CRSR DN}{3 CRSR LFs} {CTRL Ø}{COMD I}
     {CTRL 9} {3 CRSR UPs}"             :REM*1Ø6
2Ø9Ø B$(11)="{CRSR RT}{CTRL 9} {CRSR RT} {C
     RSR DN}{3 CRSR LFs}{CTRL 9} {SHFT LB.}
     {CTRL Ø}{SHFT LB.}{CTRL 9}{CRSR DN}{3
     CRSR LFs} {CTRL Ø}{COMD *}{CTRL 9}{COM
     D *}{CRSR DN}{3 CRSR LFs} {CRSR RT} {3
      CRSR UPs}"                        :REM*12
21ØØ B$(12)="{CRSR RT}{CTRL 9} {CRSR DN}{CR
     SR LF} {CRSR RT}{CRSR DN}{2 CRSR LFs}
     {CRSR DN}{CRSR LF} {CTRL Ø}{2 COMD Is}
     {3 CRSR UPs}"                      :REM*198
```


→

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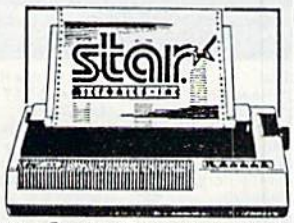

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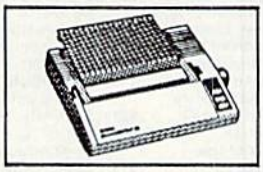

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Listing 1 continued.

```
211Ø B$(13)="{CRSR RT}{CTRL 9} {COMD *}{SHF
     T LB.} {CRSR DN}{4 CRSR LFs} {CTRL Ø}{
     COMD *}{SHFT LB.}{CTRL 9} {CRSR DN}{4
     CRSR LFs} {2 CRSR RTs} {CRSR DN}{4 CRS
     R LFs} {2 CRSR RTs} {3 CRSR UPs}"
                                    :REM*48
212Ø B$(14)="{CRSR RT}{CTRL 9} {COMD *} {CR
     SR DN}{3 CRSR LFs} {CTRL Ø}{COMD *}{CT
     RL 9} {CRSR DN}{3 CRSR LFs} {CRSR RT}
     {CRSR DN}{3 CRSR LFs} {CRSR RT} {3 CRS
     R UPs}"                        :REM*1Ø6
213Ø B$(15)="{CRSR RT}{CTRL 9}{3 SPACEs}{CR
     SR DN}{3 CRSR LFs} {CRSR RT} {CRSR DN}
     {3 CRSR LFs} {CRSR RT} {CRSR DN}{3 CRS
     R LFs} {CTRL Ø}{COMD I}{CTRL 9} {CTRL
     Ø}{3 CRSR UPs}"                :REM*132
214Ø B$(16)="{CRSR RT}{CTRL 9}{3 SPACEs}{CR
     SR DN}{3 CRSR LFs} {CRSR RT} {CRSR DN}
     {3 CRSR LFs} {2 COMD Is}{CRSR DN}{3 CR
     SR LFs} {2 CRSR RTs}{3 CRSR UPs}"
                                    :REM*18
215Ø B$(17)="{CRSR RT}{CTRL 9}{3 SPACEs}{CR
     SR DN}{3 CRSR LFs} {CRSR RT} {CRSR DN}
     {3 CRSR LFs} {CRSR RT} {CRSR DN}{3 CRS
     R LFs} {COMD V} {CTRL Ø}{COMD F}{3 CRS
     R UPs}"                        :REM*136
216Ø B$(18)="{CRSR RT}{CTRL 9}{3 SPACEs}{CR
     SR DN}{3 CRSR LFs} {CRSR RT} {CRSR DN}
     {3 CRSR LFs} {COMD I}{COMD C}{CRSR DN}
     {3 CRSR LFs} {CRSR RT} {3 CRSR UPs}"
                                    :REM*98
217Ø B$(19)="{CRSR RT}{CTRL 9}{3 SPACEs}{CR
     SR DN}{3 CRSR LFs} {CRSR RT}{COMD I}{C
     RSR DN}{3 CRSR LFs}{2 COMD Is} {CRSR D
     N}{3 CRSR LFs} {CTRL Ø}{COMD I}{CTRL 9
     } {3 CRSR UPs}"                :REM*14Ø
218Ø B$(2Ø)="{CRSR RT}{CTRL 9}{3 SPACEs}{CR
     SR DN}{2 CRSR LFs} {CRSR RT}{CRSR DN}{
     2 CRSR LFs} {CRSR DN}{CRSR LF} {CTRL Ø
     }{CRSR RT}{3 CRSR UPs}"        :REM*228
219Ø B$(21)="{CRSR RT}{CTRL 9} {CRSR RT} {C
     RSR DN}{3 CRSR LFs} {CRSR RT} {CRSR DN
     }{3 CRSR LFs} {CRSR RT} {CRSR DN}{3 CR
     SR LFs} {CTRL Ø}{COMD I}{CTRL 9} {3 CR
     SR UPs}"                       :REM*214
22ØØ B$(22)="{CRSR RT}{CTRL 9} {CRSR RT} {C
     RSR DN}{3 CRSR LFs} {CRSR RT} {CRSR DN
     }{3 CRSR LFs} {CRSR RT} {CRSR DN}{3 CR
     SR LFs}{CTRL Ø}{COMD *}{COMD I}{SHFT L
     B.}{3 CRSR UPs}"               :REM*46
221Ø B$(23)="{CRSR RT}{CTRL 9} {2 CRSR RTs}
     {CRSR DN}{4 CRSR LFs} {2 CRSR RTs} {C
     RSR DN}{4 CRSR LFs} {SHFT LB.}{COMD *}
     {CRSR DN}{4 CRSR LFs} {CTRL Ø}{SHFT L
     B.}{COMD *}{CTRL 9} {3 CRSR UPs}"
                                    :REM*54
222Ø B$(24)="{CRSR RT}{CTRL 9} {CRSR RT} {C
     RSR DN}{3 CRSR LFs} {CRSR RT} {CRSR DN
     }{3 CRSR LFs}{COMD V}{COMD I}{COMD C}{
     CRSR DN}{3 CRSR LFs} {CRSR RT} {3 CRSR
     UPs}"                          :REM*216
223Ø B$(25)="{CRSR RT}{CTRL 9} {CRSR RT} {C
     RSR DN}{3 CRSR LFs} {CRSR RT} {CRSR DN
     }{3 CRSR LFs}{COMD I} {COMD I}{CRSR DN
     }{2 CRSR LFs} {CTRL Ø}{CRSR RT}{3 CRSR
     UPs}"                          :REM*Ø
224Ø B$(26)="{CRSR RT}{CTRL 9}{3 SPACEs}{CR
     SR DN}{2 CRSR LFs}{SHFT LB.}{CTRL Ø}{S
     HFT LB.}{CTRL 9}{CRSR DN}{3 CRSR LFs}{
     SHFT LB.}{CTRL Ø}{SHFT LB.}{CTRL 9}{CR
     SR DN}{2 CRSR LFs} {CTRL Ø}{2 COMD Is}
     {3 CRSR UPs}"                  :REM*9Ø
225Ø B$(32)="{4 CRSR RTs}"          :REM*86
226Ø B$(33)="{CRSR RT}{CTRL 9} {CRSR DN}{CR
     SR LF} {CRSR DN}{CRSR LF}{COMD I}{CRSR
     DN}{CRSR LF}{CTRL Ø}{SHFT Q}{3 CRSR U
     Ps}"                           :REM*236
```

```
227Ø B$(39)="{CRSR RT}{CTRL 9}{SHFT LB.}{CT
      RL Ø}{SHFT LB.}"                    :REM*62
228Ø B$(42)="{CRSR RT}"                   :REM*192
229Ø B$(43)="{CRSR RT}{CRSR DN}{COMD P}{CTR
      L 9} {CTRL Ø}{COMD P}{CRSR DN}{3 CRSR
      LFs}{COMD Y}{CTRL 9} {CTRL Ø}{COMD Y}{
      2 CRSR UPs}"                        :REM*156
23ØØ B$(44)="{CRSR RT}{3 CRSR DNs}{CTRL 9}{
      COMD Y}{CRSR DN}{CRSR LF}{CTRL Ø}{COMD
       C}{4 CRSR UPs}"                    :REM*12Ø
231Ø B$(45)="{CTRL Ø}{CRSR RT}{CRSR DN}{3 C
      OMD Ps}{CRSR DN}{3 CRSR LFs}{3 COMD Ys
      }{2 CRSR UPs}"                      :REM*199
232Ø B$(46)="{CTRL Ø}{CRSR RT}{3 CRSR DNs}{
      SHFT Q}{3 CRSR UPs}"                :REM*5
233Ø B$(47)="{4 CRSR RTs}{CTRL 9}{SHFT LB.}
      {CTRL Ø}{SHFT LB.}{CRSR DN}{3 CRSR LFs
      }{CTRL 9}{SHFT LB.}{CTRL Ø}{SHFT LB.}{
      CRSR DN}{3 CRSR LFs}{CTRL 9}{SHFT LB.}
      {CTRL Ø}{SHFT LB.}{CRSR DN}{3 CRSR LFs
      }{CTRL 9}{SHFT LB.}{CTRL Ø}{SHFT LB.}{
      3 CRSR RTs}{3 CRSR UPs}"            :REM*97
234Ø B$(48)="{CRSR RT}{CTRL 9} {COMD P} {CR
      SR DN}{3 CRSR LFs} {CTRL Ø}{COMD D}{CT
      RL 9} {CRSR DN}{3 CRSR LFs} {CTRL Ø}{C
      OMD V}{CTRL 9} {CRSR DN}{3 CRSR LFs} {
      CTRL Ø}{COMD I}{CTRL 9} {3 CRSR UPs}{C
      TRL Ø}"                             :REM*121
235Ø B$(49)="{CRSR RT}{CTRL Ø}{COMD D}{CTRL
       9} {CRSR DN}{CRSR LF} {CRSR DN}{CRSR
      LF} {CRSR DN}{2 CRSR LFs}{CTRL Ø}{COMD
       D}{CTRL 9} {CTRL Ø}{COMD F}{3 CRSR UP
      s}"                                 :REM*41
236Ø B$(5Ø)="{CRSR RT}{CTRL 9} {COMD P} {CR
      SR DN}{2 CRSR LFs}{SHFT LB.}{CTRL Ø}{S
      HFT LB.}{CTRL 9}{CRSR DN}{3 CRSR LFs}{
      SHFT LB.}{CTRL Ø}{SHFT LB.}{CTRL 9}{CR
      SR DN}{2 CRSR LFs} {CTRL Ø}{2 COMD Is}
      {3 CRSR UPs}"                       :REM*163
237Ø B$(51)="{CRSR RT}{CTRL 9} {COMD P} {CR
      SR DN}{2 CRSR LFs}{SHFT LB.}{CTRL Ø}{S
      HFT LB.}{CTRL 9}{CRSR DN}{2 CRSR LFs}{
      COMD I} {CRSR DN}{3 CRSR LFs} {CTRL Ø}
      {COMD I}{CTRL 9} {CTRL Ø}{3 CRSR UPs}"
                                          :REM*193
238Ø B$(52)="{2 CRSR RTs}{CTRL 9}{SHFT LB.}
       {CRSR DN}{3 CRSR LFs}{SHFT LB.}{CTRL
      Ø}{SHFT LB.}{CTRL 9} {CRSR DN}{3 CRSR
      LFs}{2 COMD Is} {CTRL Ø}{COMD V}{CRSR
      DN}{2 CRSR LFs}{CTRL 9} {3 CRSR UPs}{C
      TRL Ø}"                             :REM*233
239Ø B$(53)="{CRSR RT}{CTRL 9} {2 COMD Ps}{
      CRSR DN}{3 CRSR LFs} {CTRL 9}{CRSR DN}
      {CRSR LF}{2 COMD Is} {CRSR DN}{3 CRSR
      LFs} {CTRL Ø}{COMD I}{CTRL 9} {CTRL Ø}
      {3 CRSR UPs}"                       :REM*87
24ØØ B$(54)="{CRSR RT}{CTRL 9} {COMD P} {CR
      SR DN}{3 CRSR LFs} {CTRL 9}{CRSR DN}{C
      RSR LF} {COMD I} {CRSR DN}{3 CRSR LFs}
       {CTRL Ø}{COMD I}{CTRL 9} {CTRL Ø}{3 C
      RSR UPs}"                           :REM*125
241Ø B$(55)="{CRSR RT}{CTRL 9} {COMD P} {CR
      SR DN}{2 CRSR LFs}{SHFT LB.}{CTRL Ø}{S
      HFT LB.}{CTRL 9}{CRSR DN}{2 CRSR LFs}
      {CRSR DN}{CRSR LF} {CTRL Ø}{CRSR RT}{3
       CRSR UPs}"                         :REM*221
242Ø B$(56)="{CRSR RT}{CTRL 9} {COMD P} {CR
      SR DN}{3 CRSR LFs} {CRSR RT} {CTRL 9}{
      CRSR DN}{3 CRSR LFs} {COMD I} {CRSR DN
      }{3 CRSR LFs} {CTRL Ø}{COMD I}{CTRL 9}
       {CTRL Ø}{3 CRSR UPs}"              :REM*245
243Ø B$(57)="{CRSR RT}{CTRL 9} {COMD P} {CR
      SR DN}{3 CRSR LFs} {CRSR RT} {CTRL 9}{
      CRSR DN}{3 CRSR LFs}{2 COMD Is} {CRSR
      DN}{3 CRSR LFs} {CTRL Ø}{COMD I}{CTRL
      9} {CTRL Ø}{3 CRSR UPs}"           :REM*83
```

→

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Listing 1 continued.

```
244Ø B$(61)="{CTRL 9}{CRSR RT}{CRSR DN}{3 C
     OMD Os}{CRSR DN}{3 CRSR LFs}{3 COMD Os
     }{2 CRSR UPs}"                    :REM*47
245Ø B$(63)="{CRSR RT}{CTRL 9}{SHFT LB.}{CO
     MD P}{COMD *}{CRSR DN}{2 CRSR LFs}{SHF
     T LB.}{CTRL Ø}{SHFT LB.}{CRSR DN}{2 CR
     SR LFs}{CTRL 9} {CRSR DN}{CRSR LF}{CTR
     L Ø}{COMD I}{3 CRSR UPs}"         :REM*129
246Ø RETURN                            :REM*223
247Ø DATA162,4,16Ø,Ø,132,251,132,253,177,25
     1                                 :REM*253
248Ø DATA145,253,2ØØ,2Ø8,249,23Ø,252,23Ø,25
     4,2Ø2                             :REM*227
249Ø DATA2Ø8,242,96                    :REM*11
25ØØ DATA172,Ø,216,136,152,41,15,162,Ø,157
                                       :REM*119
251Ø DATAØ,216,157,Ø,217,157,Ø,218,157,Ø
                                       :REM*141
252Ø DATA219,232,2Ø8,241,141,134,2,96,-1
                                       :REM*2Ø1
```

Listing 2. *ScreenViewer program.*

```
1 REM ********************************
                                       :REM*145
2 REM *{31 SPACEs}*                    :REM*52
3 REM *{3 SPACEs}'SCREEN BOOTER' (C) 1985{4
   SPACEs}*                            :REM*33
4 REM *{31 SPACEs}*                    :REM*54
5 REM *{3 SPACEs}BY DOUG SMOAK{15 SPACEs}*
                                       :REM*63
6 REM *{6 SPACEs}3Ø3 HEYWARD ST.{1Ø SPACEs}
  *                                    :REM*78
7 REM *{6 SPACEs}COLUMBIA, S.C.{2 SPACEs}29
  2Ø1{4 SPACEs}*                       :REM*139
8 REM *{31 SPACEs}*                    :REM*58
9 REM ********************************
                                       :REM*153
1Ø POKE5328Ø,11:POKE53281,11:POKE646,12:PRI
   NT"{SHFT CLR}SCREEN BOOTER"         :REM*44
2Ø PRINT"{CRSR DN}ONE MOMENT PLEASE...";
                                       :REM*76
3Ø DIMA(392)                           :REM*188
4Ø FORI=1TO2:READA(I):PRINT".";:NEXT
                                       :REM*136
5Ø FORI=3TO258:A(I)=2:PRINT".";:NEXT
                                       :REM*242
6Ø FORI=259TO392:READA(I):PRINT".";:NEXT
                                       :REM*254
7Ø INPUT"{SHFT CLR}{CRSR DN}SCREEN NAME ";S
   N$:IFLEN(SN$)>16ORSN$=""THEN7Ø      :REM*62
8Ø A(282)=LEN(SN$)                     :REM*1Ø
9Ø FORI=1TOLEN(SN$):A(362+I)=ASC(MID$(SN$,I
   ,1)):NEXT                           :REM*12Ø
1ØØ INPUT"{CRSR DN}PROGRAM NAME ";PN$:IFLEN
    (PN$)>16ORPN$=""THEN1ØØ            :REM*1Ø2
11Ø IFPN$=SN$THENPRINT"{CRSR DN}FILENAMES A
    RE THE SAME!!":GOTO7Ø              :REM*74
12Ø FORI=1TOLEN(PN$):A(378+I)=ASC(MID$(PN$,
    I,1)):NEXT:A(337)=LEN(PN$)         :REM*134
13Ø INPUT"{SHFT CLR}{CRSR DN}IS THIS A BASI
    C PROGRAM";BS$:IFBS$=""THEN13Ø     :REM*118
14Ø BS$=LEFT$(BS$,1):IFBS$<>"Y"ANDBS$<>"{SH
    FT Y}"THEN17Ø                      :REM*21Ø
16Ø GOTO19Ø                            :REM*234
17Ø INPUT"{CRSR DN}SYS ADDRESS FOR ML PRG."
    ;SY:HI=INT(SY/256):LO=SY-256*HI:REM*132
18Ø A(357)=76:A(358)=LO:A(359)=HI      :REM*44
19Ø INPUT"{CRSR DN}BORDER COLOR (Ø-15)";BC:
    BC=15ANDBC:A(296)=BC               :REM*232
2ØØ INPUT"{CRSR DN}SCREEN COLOR (Ø-15)";SC:
    SC=15ANDSC:A(298)=SC               :REM*26
21Ø INPUT"{CRSR DN}CHARACTER COLOR (Ø-15)";
    CC:CC=15ANDCC:A(3ØØ)=CC:IFCC=SCTHEN21Ø
                                       :REM*24
22Ø INPUT"{SHFT CLR}{CRSR DN}BOOT NAME ";BN
    $                                  :REM*248
23Ø BN$="Ø:"+BN$+",P,W"                :REM*8Ø
24Ø OPEN15,8,15,"I":OPEN8,8,8,BN$      :REM*66
25Ø INPUT#15,A,B$,C,D:IFATHENCLOSE8:CLOSE15
    :PRINTA,B$:END                     :REM*136
26Ø PRINT"{CRSR DN}WORKING...";        :REM*75
27Ø FORI=1TO392:PRINT#8,CHR$(A(I));:PRINT".
    ";:NEXT                            :REM*249
28Ø CLOSE8:CLOSE15:END                 :REM*55
29Ø DATAØ,1,Ø,Ø,Ø,12Ø                  :REM*9
3ØØ DATA169,147,32,21Ø,255,169,Ø,133,157,16
    9                                  :REM*253
31Ø DATA8,162,8,16Ø,1,32,186,255,169,6
                                       :REM*61
32Ø DATA162,1Ø4,16Ø,2,32,189,255,169,Ø,32
                                       :REM*187
33Ø DATA213,255,162,Ø,16Ø,Ø,169,1,142,32
                                       :REM*211
34Ø DATA2Ø8,14Ø,33,2Ø8,162,Ø,157,Ø,216,157
                                       :REM*171
35Ø DATAØ,217,157,Ø,218,157,Ø,219,2Ø2,2Ø8
                                       :REM*129
36Ø DATA241,138,133,157,169,8,162,8,16Ø,1
                                       :REM*251
37Ø DATA32,186,255,169,6,162,12Ø,16Ø,2,32
                                       :REM*83
38Ø DATA189,255,169,Ø,32,213,255,134,45,132
                                       :REM*27
39Ø DATA46,88,169,1,32,89,166,76,174,167,Ø,
    Ø,Ø                                :REM*121
4ØØ DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*61
41Ø DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*71
42Ø DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,255          :REM*121
```

Listing 3. *ScreenBooter program.*

```
1 REM ********************************
                                       :REM*145
2 REM *{2 SPACEs}'SCREEN VIEWER' (C) 1985{5
   SPACEs}*                            :REM*222
3 REM *{3 SPACEs}BY DOUG SMOAK{15 SPACEs}*
                                       :REM*61
4 REM *{6 SPACEs}3Ø3 HEYWARD ST.{1Ø SPACEs}
  *                                    :REM*76
5 REM *{6 SPACEs}COLUMBIA, S.C. 2Ø2Ø1{5 SPA
  CEs}*                                :REM*137
6 REM *{31 SPACEs}*                    :REM*56
7 REM * WILL LOAD A SERIES OF SCREENS *
                                       :REM*39
8 REM * CREATED BY GRAPHMAKER 64 OR{3 SPACE
  s}*                                  :REM*86
9 REM * SCREENMAKER 64.{15 SPACEs}*:REM*211
1Ø REM********************************
                                       :REM*154
15 POKE5328Ø,12:POKE53281,11           :REM*2Ø5
2Ø T1$="{SHFT CLR}{COMD 5}{CTRL 9}{14 SPACE
   s}SCREEN VIEWER{13 SPACEs}{CTRL Ø}"
                                       :REM*48
3Ø FORI=ØTO23:READA                    :REM*18Ø
4Ø POKE49152+I,A:CK=CK+A:NEXT          :REM*25Ø
5Ø IFCK<>4Ø77THENPRINTT1$"{CRSR DN}{CRSR RT
   }ERROR IN DATA STATEMENTS!":END     :REM*162
6Ø DIMF$(83)                           :REM*162
7Ø PRINTT1$                            :REM*23Ø
8Ø PRINT"{CRSR DN}{CRSR RT}C{LEFT ARROW}{CT
   RL 9} CREATE {CTRL Ø} A NAME FILE"
                                       :REM*148
9Ø PRINT"{CRSR DN}{CRSR RT}L{LEFT ARROW}{CT
   RL 9} LOAD{3 SPACEs}{CTRL Ø} A NAME FILE
   "                                   :REM*11Ø
1ØØ PRINT"{CRSR DN}{CRSR RT}E{LEFT ARROW}{C
    TRL 9} END{4 SPACEs}{CTRL Ø} "     :REM*166
11Ø GETOP$:IFOP$<>"L"ANDOP$<>"C"ANDOP$<>"E"
    THEN11Ø                            :REM*13Ø
```

```
12Ø IFOP$="L"THENGOSUB155Ø:IFSF$<>""THEN3ØØ
                                        :REM*238
13Ø IFOP$="E"THENPRINT"{SHFT CLR}":END
                                         :REM*32
14Ø IFOP$<>"C"THEN7Ø                    :REM*1Ø6
15Ø :                                   :REM*126
16Ø REM ------ INPUT SCREEN NAMES -----
                                         :REM*3Ø
17Ø :                                   :REM*146
18Ø PRINTT1$                            :REM*84
19Ø NS$="":INPUT"{CRSR DN}{CRSR RT}HOW MANY
    SCREENS TO VIEW";NS$                :REM*124
2ØØ NS=VAL(NS$):IFNS<1THEN7Ø            :REM*212
21Ø FORI=1TONS                          :REM*26
22Ø SN$="":PRINTT1$"{CRSR DN}{CRSR RT}SCREE
    N NAME"I;                           :REM*12
23Ø INPUTSN$:IFLEN(SN$)>14THEN22Ø       :REM*116
24Ø IFSN$=""THEN22Ø                     :REM*174
25Ø F$(I)=SN$                            :REM*6
26Ø NEXT                                :REM*15
27Ø :                                   :REM*247
28Ø REM --------- EDIT OPTION ---------
                                        :REM*175
29Ø :                                    :REM*11
3ØØ PRINTT1$:POKE5328Ø,12:POKE53281,11
                                        :REM*55
31Ø PRINT"{CRSR DN}{CRSR RT}C{LEFT ARROW}{C
    TRL 9} CONTINUE{3 SPACEs}{CTRL Ø}"
                                        :REM*229
32Ø PRINT"{CRSR DN}{CRSR RT}E{LEFT ARROW}{C
    TRL 9} EDIT NAMES {CTRL Ø}"     :REM*177
33Ø GETA$:IFA$<>"C"ANDA$<>"E"ANDA$<>CHR$(14
    1)THEN33Ø                           :REM*153
34Ø IFA$="C"THEN53Ø                      :REM*51
35Ø IFA$=CHR$(141)THEN7Ø                 :REM*73
36Ø PRINT:GOSUB126Ø                     :REM*119
37Ø :                                    :REM*91
38Ø REM ------- EDIT SCREEN NAME ------
                                         :REM*87
39Ø :                                   :REM*111
4ØØ PRINTT1$                             :REM*49
41Ø PRINT"{CRSR DN}{CRSR RT}SCREEN NUMBER T
    O EDIT? 1 -"NS;                      :REM*43
42Ø E$="":INPUTE$:E=VAL(E$):IFE$=""THEN3ØØ
                                          :REM*5
43Ø IFE<1ORE>NSTHEN4ØØ                  :REM*1Ø3
44Ø PRINT"{CRSR DN}{CRSR RT}SCREEN #"E"= "F
    $(E)                                 :REM*61
45Ø PRINT"{CRSR DN}{CRSR RT}NEW SCREEN #"E;
                                         :REM*59
46Ø F$="":INPUTF$                       :REM*193
47Ø IFF$=""THEN4ØØ                      :REM*187
48Ø IFLEN(F$)>14THEN45Ø                  :REM*45
49Ø F$(E)=F$:GOTO3ØØ                    :REM*253
5ØØ :                                   :REM*221
51Ø REM -------- SAVE OPTION ----------
                                         :REM*29
52Ø :                                   :REM*242
53Ø PRINTT1$                            :REM*18Ø
54Ø PRINT"{CRSR DN}{CRSR RT}S{LEFT ARROW}{C
    TRL 9} SAVE {CTRL Ø} NAME FILE":REM*242
55Ø PRINT"{CRSR DN}{CRSR RT}V{LEFT ARROW}{C
    TRL 9} VIEW {CTRL Ø} WITH NO SAVE"
                                        :REM*146
56Ø GETA$:IFA$=CHR$(141)THEN3ØØ     :REM*132
57Ø IFA$<>"S"ANDA$<>"V"THEN56Ø       :REM*14Ø
58Ø IFA$="S"THENGOSUB139Ø:GOTO3ØØ     :REM*5Ø
59Ø :                                   :REM*56
6ØØ REM -------- VIEW MENU 1 ----------
                                         :REM*6Ø
61Ø :                                    :REM*76
62Ø PRINT"{SHFT CLR}{CTRL 9}{13 SPACEs}VIEW
    ING OPTIONS{12 SPACEs}"          :REM*38
63Ø PRINT"{CRSR DN}{CRSR RT}1{LEFT ARROW}{C
    TRL 9} SHORT{2 SPACEs}{CTRL Ø} DELAY BE
    TWEEN SCREENS"                       :REM*96
64Ø PRINT"{CRSR DN}{CRSR RT}2{LEFT ARROW}{C
    TRL 9} MEDIUM {CTRL Ø} DELAY BETWEEN SC
    REENS"                              :REM*128
65Ø PRINT"{CRSR DN}{CRSR RT}3{LEFT ARROW}{C
    TRL 9} LONG{3 SPACEs}{CTRL Ø} DELAY BET
    WEEN SCREENS"                       :REM*144
66Ø GETA$:IFA$=CHR$(141)THEN53Ø      :REM*248
67Ø IFA$<"1"ORA$>"3"THEN66Ø            :REM*8
68Ø DL=VAL(A$)                          :REM*34
69Ø :                                   :REM*156
7ØØ REM -------- VIEW MENU 2 ----------
                                        :REM*168
71Ø :                                   :REM*176
72Ø PRINT"{SHFT CLR}{CTRL 9}{13 SPACEs}VIEW
    ING OPTIONS{12 SPACEs}"          :REM*138
73Ø PRINT"{CRSR DN}{CRSR RT}1{LEFT ARROW}SH
    OW {CTRL 9} ONCE{9 SPACEs}"      :REM*228
74Ø PRINT"{CRSR DN}{CRSR RT}2{LEFT ARROW}SH
    OW {CTRL 9} CONTINUOUSLY "        :REM*36
75Ø GETA$:IFA$=CHR$(141)THEN62Ø       :REM*8Ø
76Ø IFA$<"1"ORA$>"2"THEN75Ø           :REM*32
77Ø CY=VAL(A$)-1                      :REM*25
78Ø PRINTT1$"{CRSR DN}{CRSR RT}INSERT DISK
    WITH SCREENS..."                  :REM*33
79Ø GOSUB133Ø:IFA$=CHR$(141)THEN72Ø:REM*191
8ØØ PRINT"{CRSR DN}{CRSR RT}O.K."   :REM*1Ø9
81Ø :                                   :REM*21
82Ø REM ------ MAIN DISPLAY LOOP ------
                                        :REM*57
83Ø :                                   :REM*41
84Ø FORF=1TONS                         :REM*123
85Ø F$=F$(F)                            :REM*59
86Ø GOSUB1Ø5Ø:IFATHENF=NS:GOTO3ØØ    :REM*235
87Ø FORK=1TO2ØØØ*DL                    :REM*227
88Ø GETG$:IFG$<>""THENK=2ØØØ*DL:IFG$=CHR$(1
    41)THEN3ØØ                         :REM*47
89Ø NEXT:NEXT                          :REM*129
9ØØ IFCYTHEN84Ø                        :REM*177
91Ø GOTO3ØØ                             :REM*91
92Ø :                                  :REM*131
93Ø REM -------- PUT FILENAME ---------
                                        :REM*93
94Ø :                                  :REM*151
95Ø FORI=1TOLEN(F$)                    :REM*245
96Ø POKE749+I,ASC(MID$(F$,I,1))        :REM*241
97Ø NEXT                               :REM*215
98Ø POKE183,LEN(F$)                     :REM*37
99Ø POKE187,238:POKE188,2               :REM*19
1ØØØ POKE186,8:POKE185,1                :REM*91
1Ø1Ø RETURN                             :REM*47
1Ø2Ø :                                 :REM*231
1Ø3Ø REM --------- LOAD SCREEN ---------
                                        :REM*138
1Ø4Ø :                                 :REM*252
1Ø5Ø GOSUB95Ø:FC=Ø:POKE157,Ø           :REM*124
1Ø6Ø POKE78Ø,Ø:SYS65493                 :REM*32
1Ø7Ø GOSUB115Ø:IFATHENRETURN           :REM*246
1Ø8Ø F$=F$+".C":GOSUB95Ø:FC=1          :REM*21Ø
1Ø9Ø POKE78Ø,Ø:SYS65493                 :REM*62
11ØØ GOSUB115Ø:IFATHENA=Ø:SYS49152:RETURN
                                        :REM*222
111Ø POKE5328Ø,PEEK(56296)              :REM*6Ø
112Ø POKE53281,PEEK(56297)              :REM*7Ø
113Ø RETURN                            :REM*168
114Ø :                                  :REM*96
115Ø REM ------ SCREEN LOAD ERROR ------
                                        :REM*72
116Ø :                                 :REM*116
117Ø OPEN15,8,15                        :REM*56
118Ø INPUT#15,A,B$,C,D                  :REM*26
119Ø CLOSE15                            :REM*1Ø
12ØØ IFFCOR(A=Ø)THENRETURN             :REM*228
121Ø PRINTT1$"{CRSR DN}{CRSR RT}DISK ERROR"
    A;B$                               :REM*114
122Ø POKE5328Ø,12:POKE53281,11         :REM*134
123Ø PRINT"{CRSR DN}{CRSR RT}ON FILE {CTRL
    9}"F$                              :REM*172
```

Listing 3 continued.

```
124Ø PRINT"{CRSR DN}{CRSR RT}TO DISPLAY SCR
     EEN NAMES ..."                    :REM*66
125Ø GOSUB133Ø                         :REM*76
126Ø FORI=1TONS                        :REM*56
127Ø PRINT"{CRSR RT}SCREEN #"I"= "F$(I)
                                       :REM*244
128Ø IFI/2Ø=INT(I/2Ø)THENGOSUB133Ø     :REM*63
129Ø NEXT:GOSUB133Ø:RETURN             :REM*45
13ØØ :                                 :REM*1
131Ø REM ------- PROMPT & WAIT --------
                                       :REM*199
132Ø :                                 :REM*21
133Ø PRINT"{CRSR DN}{CRSR RT}PRESS {CTRL 9}
     [RETURN]{CTRL Ø}":PRINT           :REM*197
134Ø GETA$:IFA$<>CHR$(13)ANDA$<>CHR$(141)TH
     EN134Ø                            :REM*163
135Ø RETURN                            :REM*133
136Ø :                                 :REM*61
137Ø REM ------- SAVE NAME FILE -------
                                       :REM*133
138Ø :                                 :REM*81
139Ø PRINTT1$"{2 CRSR DNs}{CRSR RT}{CTRL 9}
      SAVE NAME FILE "                 :REM*113
14ØØ SF$="":INPUT"{CRSR DN}{2 CRSR RTs}FILE
     NAME";SF$                         :REM*93
141Ø IFSF$=""THENRETURN                :REM*161
142Ø IFLEN(SF$)>16THEN139Ø             :REM*169
143Ø OPEN15,8,15                       :REM*61
144Ø OPEN8,8,8,"@Ø:"+SF$+",S,W"        :REM*87
145Ø GOSUB171Ø                         :REM*21
146Ø IFATHEN139Ø                       :REM*41
147Ø PRINT"{CRSR DN}{CRSR RT}O.K."     :REM*13
148Ø PRINT#8,NS$                       :REM*99
149Ø FORI=1TONS                        :REM*31
15ØØ PRINT#8,F$(I)                     :REM*73
151Ø NEXT:CLOSE8:CLOSE15:RETURN        :REM*175
152Ø :                                 :REM*221
153Ø REM ------ LOAD NAME FILE -------
                                       :REM*239
154Ø :                                 :REM*242
155Ø PRINTT1$"{2 CRSR DNs}{CRSR RT}{CTRL 9}
      LOAD NAME FILE "                 :REM*156
156Ø SF$="":INPUT"{CRSR DN}{2 CRSR RTs}FILE
     NAME";SF$                         :REM*254
157Ø IFSF$=""THENRETURN                :REM*66
158Ø IFLEN(SF$)>16THEN155Ø             :REM*2Ø2
159Ø OPEN15,8,15                       :REM*222
16ØØ OPEN8,8,8,"Ø:"+SF$+",S,R"         :REM*176
161Ø GOSUB171Ø                         :REM*182
162Ø IFATHEN155Ø                       :REM*74
163Ø PRINT"{CRSR DN}{CRSR RT}O.K."     :REM*174
164Ø INPUT#8,NS$:NS=VAL(NS$)           :REM*132
165Ø FORI=1TONS                        :REM*192
166Ø INPUT#8,F$(I)                     :REM*154
167Ø NEXT:CLOSE8:CLOSE15:RETURN        :REM*8Ø
168Ø :                                 :REM*126
169Ø REM -- ERROR FOR NAME LOAD/SAVE --
                                       :REM*176
17ØØ :                                 :REM*146
171Ø INPUT#15,A,B$,C,D                 :REM*46
172Ø IFA=ØTHENRETURN                   :REM*9Ø
173Ø CLOSE8:CLOSE15                    :REM*17Ø
174Ø PRINTT1$:PRINT"{CRSR DN}{CRSR RT}DISK
     ERROR"A;B$                        :REM*22
175Ø GOSUB133Ø:RETURN                  :REM*238
176Ø :                                 :REM*2Ø6
177Ø REM -- M.L. DATA --               :REM*42
178Ø :                                 :REM*226
179Ø DATA16Ø,Ø,132,251,169,216,133,252,162,
     4                                 :REM*72
18ØØ DATA173,134,2,145,251,2ØØ,2Ø8,251,23Ø,
     252                               :REM*251
181Ø DATA2Ø2,2Ø8,246,96                :REM*243
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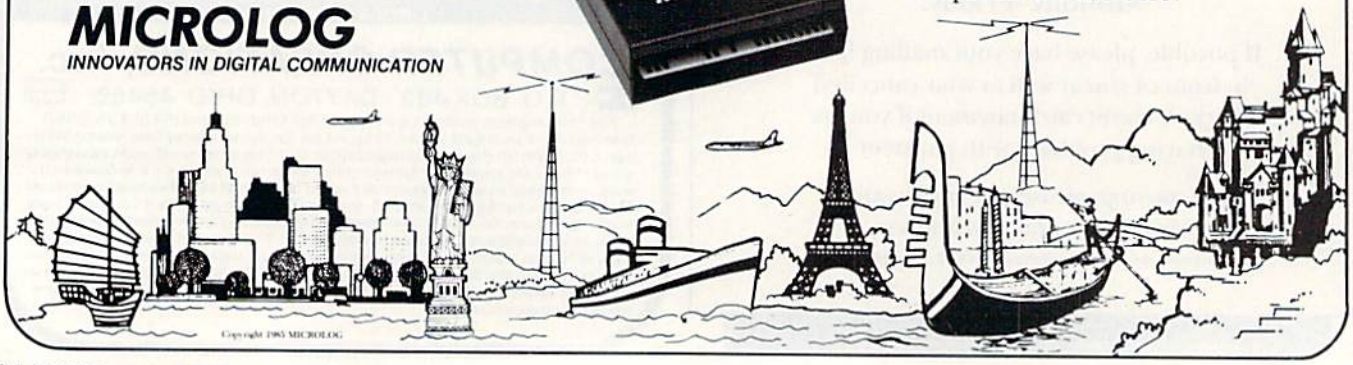

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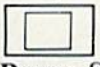 Regular $49.95

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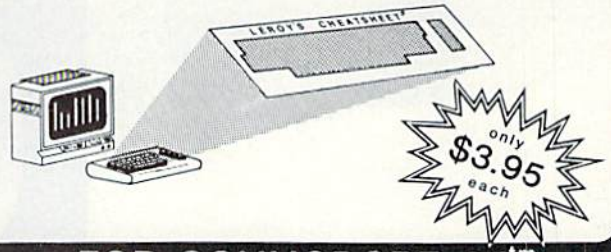

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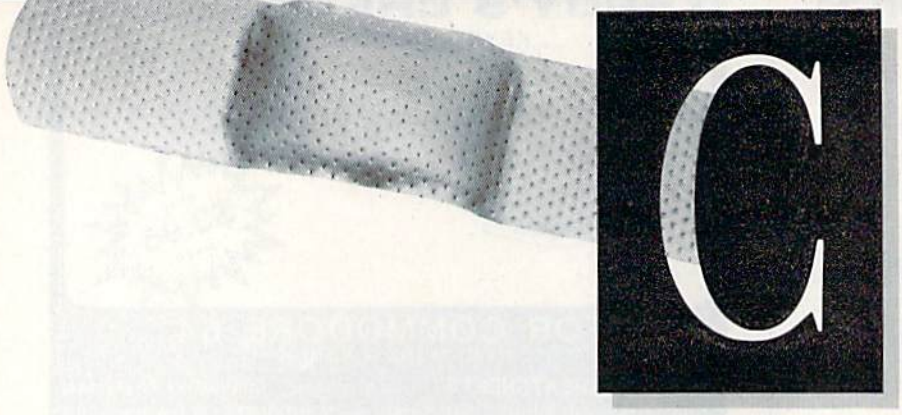

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Queries are answered only through this column, but, due to the volume of mail, only those questions that appeal to the majority of our readers will be published. Please do not enclose a self-addressed stamped envelope, since we cannot provide personal responses nor answer questions before publication.

UPDATES

Update: In *RUN*'s July 1985 issue, Gil Doubrava of San Antonio, TX, had a tape problem. If his program is stored on tape, I have a utility that can rescue any portion of the program from tape. Please write him or send me his address.

Victor Swindell
Box 1152
Laurinburg, NC 28352

A: I can't play postman for you, and I find no reference to either tape or disk in Mr. Doubrava's question, but I'm happy to include your offer and address and feel sure you'll hear from several cassette users with problems. Thanks for offering to help.

Update: In my recent remarks about CP/M on the 64 and C-128, I neglected to mention a company that serves as somewhat of a user's group for those using CP/M on Commodore products.

For the past year, Poseidon International (103 Waverley Place, New York, NY 10011; 212-777-9515) has been sending me information about CP/M on the 64 and, now, the C-128, along with lists of their 28 disks of CP/M programs. I haven't tested any to be sure, but several of the disks appear to contain useful programs at prices comparable to those of other user's groups. Commodore CP/M users might want to request Poseidon's current catalog.

HARDWARE

Q: **Sixteen-bit microprocessors are claimed to give faster computer operation. In your opinion, why didn't Commodore include one in the C-128?**

Keith Marshall
Trinidad, West Indies

A: True 16-bit microprocessors, like the 68000 in Commodore's new Amiga computer or the Z8000 in Commodore's European model 900 computer *do* handle more data in a given amount of time than the 8-bit microprocessors used in other Commodore computers, potentially offering a four-fold increase in speed. However, they are also incompatible with all programs written for other Commodore computers, and even with each other. Since complete compatibility with the 64 was an important design goal for the C-128, none of the current 16-bit microprocessors would have been appropriate for it.

Q: **I am interested in purchasing a color monitor for my Commodore 64 and would like to know the difference between Commodore's 1701 monitor and their 1702 monitor. Are Commodore monitors better to buy for Commodore computers? Also, do you know anything about Commodore's new 1902 monitor?**

Robby Guttman
West Nyack, NY

A: The only difference I've heard mentioned between the 1701 and the 1702 is that the 1702 apparently uses a switching power supply and the 1701 doesn't. I haven't heard any complaints about either one.

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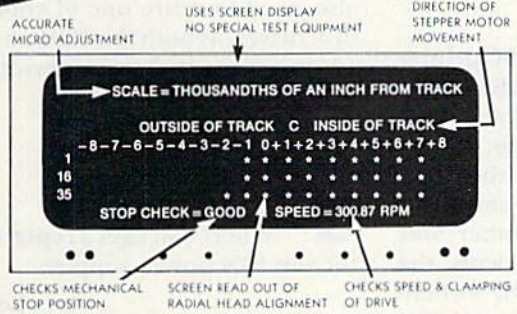
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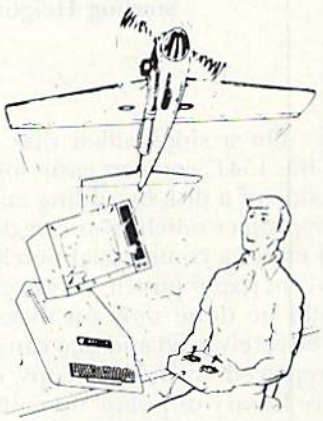

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As for the 1902, mine is working very well with both 64s and the C-128, as well as with my Corona PC-compatible. In 80-column RGBI mode, it gives a clearer, more colorful display than the far more expensive IBM color monitor I tested last week. In its other modes, it emulates the 1701 and 1702 quite well. Both the 1701 and 1702 have sold widely to owners of non-Commodore computers, and I expect the same to happen with the 1902.

Yes, Commodore monitors are good buys for Commodore computers, but they are also excellent buys for other computers.

Q: I would like to know if a disk notcher (a puncher used to make another write-enable notch on the back side of a disk) is safe to use on a disk that is full on one side. Can it damage disks?

Gordon Rimac
Sterling Heights, MI

A: On a single-sided disk drive like the 1541, you can easily use the flip side of a disk by adding another write-protect notch. You can do this with either a commercial notcher or a 59-cent paper punch. However, this should be done only on disks that will be rarely used and that can easily be replaced, such as a copy of an entire library of public domain programs from your user's group.

The caution is due to two problems. One, the disks prepared this way will have to be recopied to be used with the new 1571 disk drive in its double-sided mode. This is because true double-sided drives like the 1571 always rotate disks in the same direction, whereas flipped disks rotate backwards when using the back side. That makes it difficult for the 1571 to make sense out of your disk unless you continue flipping it manually as before.

Second, the backwards rotation tends to release dirt that has been captured by the cleaning pad inside the disk jacket, and more of it than usual will end up on the read/write head. This will require more frequent cleanings and possible repairs down the road.

Q: I bought a Star SG-10C printer for my 64, and I'm in seventh heaven. However, it works with the "Print Shop" only as a 1525. Also, it's inconvenient not to have the fully formed banner characters and page-positioning options that other Star printers can accomplish with the "Print Shop." If I change DIP switches, could I make my printer work like those other printers?

Wes Dickhut
Scott City, KS

A: No. As you've already discovered, it's best to think of it as strictly a Commodore printer, somewhat unlike the rest of the Star line. Other SG-10C owners are reporting that it is an excellent alternative to Commodore's printers, but that its Commodore emulation is permanent and can't be turned off to make it Epson-compatible like other Star printers.

Q: We are using a C-64 with four 1541 drives for active files. We would like to know if a 1-megabyte drive with an IEEE-488 interface would help us. One is available through an outlet house. How would it affect our existing disks and programs?

Bill Carlson
Phoenix, AZ

A: The drive is probably the SFD-1001, in my opinion the best single disk drive Commodore ever made. Originally designed as a single drive version of the $2300 8250 drive for CBM owners, it looks just like a 1541. Mine worked quite well with the 64 via a Bus Card II IEEE-488 interface from Batteries Included (30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5). I haven't tested the interface being sold with it by outlet houses, but the drive itself is an excellent bargain at its current closeout price and is now being used by several bulletin board systems with good results.

However, you're likely to encounter a problem if you use this drive with commercial programs that require the 1541 disk format. You may also need to retire one of your 1541 disk drives, as both the 1001 and your 1541s expect to have a device number between 8 and 11.

Q: Where can I get a replacement for the 64's power supply?

Le Tuan
Mountain View, CA

A: Skyles Electric Works, a well-known supplier of Commodore products, is located in Mountain View and can probably help you. If not, replacement power supplies are also available from JSR Enterprises (10035 White Pine Lane, Santee, CA 92071; 619-449-9748).

Q: By just adding the correct cable, can data be transmitted and received via the RS-232 ports of two computers appropriately equipped? If not, what reverses are needed for a 64 and 8032?

Julian M. Dean
Bay Minette, AL

A: Yes, computers equipped with RS-232 ports can generally use these ports to chat back and forth with other computers so equipped. However, since such ports are normally connected to a modem or printer rather than another computer, you'll need to do a bit of rewiring. Simply swapping pins 2 and 3 at one end of your cable may do the trick.

However, an easier and better way to do this is by plugging a null modem adapter into the cable between the two computers. It switches all the pins that could cause trouble, and you can quickly remove it when you want to use your RS-232 port with a modem or printer again. Radio Shack is one supplier of both RS-232 cables and null modem adapters.

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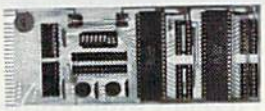

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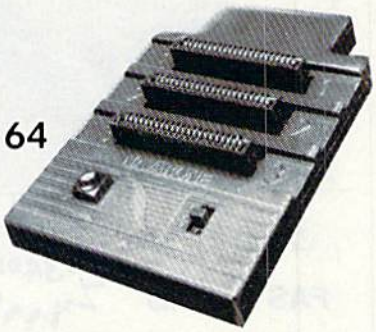

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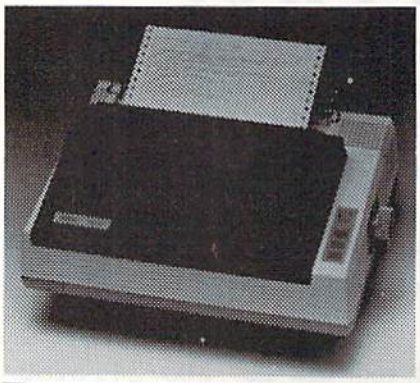

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Commodore Clinic

Remember that neither the 64 nor the 8032 has a true RS-232 port as sold. The 64 will need Commodore's 1011-A RS-232 interface, which I understand may have been discontinued, or an equivalent from another company. If you buy a substitute version, be careful about its power consumption—some draw enough power to roast your power supply.

As for the 8032, an inexpensive RS-232 cable may still be available from Commodore.

SOFTWARE

Q: I recently wrote a program for the C-64. After completion, I realized that a few Gosub statements could reduce the program by 50 lines. Is there a way I could remove large numbers of program lines without typing each individual line number and pressing the return key? Each line is an increment of 10 and the lines I wish to delete are consecutive.

Charles Schley
Lodi, NJ

A: You need the Delete command, a standard part of Basic on the Plus/4, Commodore 16 and Commodore 128. It is readily available to 64 owners as part of several commercial and public domain programs that extend the Basic command set. One of the first public domain programs to include it is Tiny Aid. It, or a suitable substitute, should be readily available from your nearest Commodore user's group library.

Q: I have just graduated to the C-64 after almost two years of enjoyable experience creating programs on my VIC-20. Most of the time I used the VIC Programmers Aid cartridge with complete success. Has anyone created a cartridge version for the C-64?

Ken Thompson
Tucson, AZ

BACK ISSUES

April 1984—The world of music. Hypnosis and the C-64, plus Disk Editor 64 program

May 1984—Database programs reviewed. Dragon Quest action game for the VIC, Music Maker program, and a behind-the-scenes look at Commodore

June 1984—The Joy of Modems. C-64 disk utility program, 64 Joystick Artist, and Munchin' Mushrooms game

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October 1984—Languages issue: Comal, Logo, Pascal, Pilot and Fortran. SID Serenade, a sprite editor, and a murder mystery game

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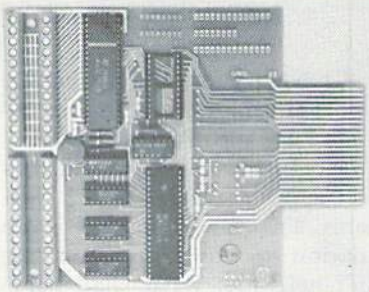

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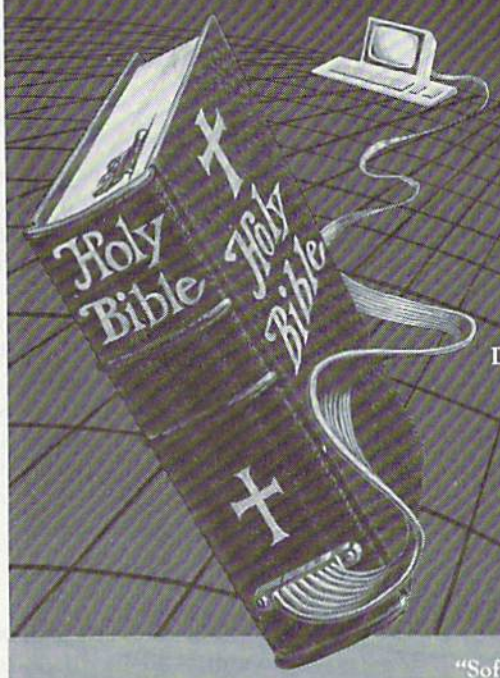

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A: Commodore offers a programmer's aid cartridge for the 64 that is almost identical to the one for the VIC. However, given Commodore's recent attempts to reduce the number of programs they sell, it may not be readily available any more. The same commands are also built into Commodore's new Plus/4, Commodore 16 and C-128 computers.

Q: **I have a Yamaha synthesizer, a Passport MIDI interface and an SX-64, which I use with Passport's MIDI/4 software. I was assured I could control the synthesizer from my own programs. Passport furnishes some information on how to do this, but it didn't help me. What shall I do? Crack the software?**

Warren Furman
Jamaica, NY

A: Since you purchased Passport's interface and software, you are probably within your rights to study them, see how they work together and use the same techniques in your own programs, as long as you will only use those programs yourself. A problem would arise only if you were to use your new knowledge to make copies of the Passport program for others, or in your own commercial products.

However, it might be easier to find, in one of the several user's groups in your area, another user who already knows how to use the interface well or to phone Passport for additional assistance. If the company is unable to help you directly, perhaps your dealer can arrange for the aid that you need.

Q: **Is there any easy way to program the 64 to alphabetize a book? I need to index by surname all the names in some books.**

Clara Nash
Farmersville, TX

A: Using either a data manager program or a word processor with a built-in sort, you will have to enter the books' names yourself. I know of only one word processor with sorting capabilities—Paper Clip, from Batteries Included (Richmond Hill, Ontario).

Many data managers would be suitable for this use. Three I have tested are The Consultant, from Batteries Included; Flex File, from Micropace Computers (1510 N. Neil, Champaign, IL); and Superbase, from Precision Software (3003 Summer St., Stamford, CT 06905). If you use a data manager, set up a file with one key field to hold your words. That way, they will automatically be maintained in alphabetical order.

PROGRAMMING

Q: **I have purchased a Plus/4 system. Most magazine programs are generally developed and given for the C-64. I can adapt most of them for the Plus/4 with little difficulty except for the Peek and Poke statements. Could you please help me learn to convert Peek/Poke addresses from the C-64 to the Plus/4?**

Rick Kona
Jacksonville, FL

A: To convert Peek and Poke statements used on the 64 to their equivalents in the Plus/4, C-16 and C-128 versions of Basic, you'll need a good memory map of the 64, preferably one that includes decimal addresses along with the hex addresses favored for work in machine language. One book that contains such information is Sheldon Leemon's *Mapping the 64*, from Compute Books.

Since most Pokes on the 64 are to a few locations, for quick reference, you may want to prepare a chart of equivalents as you discover them.

Q: **Is it possible to erase a disk directory and still read its files? Is there a program that would do this?**

Eric Larson
Webster, WI

A: Yes, you can erase a directory and still read files, including program files. To do this, erase the directory by scratching all the files on it, rather than by headering (formatting) the disk. At this point, all files are still on the disk and all the directory information is still in the directory except for the file-type byte, which has been changed to 0 for each file. That's how the disk operating system knows that the file has been scratched.

To read or load a file, merely restore the file-type byte for that file to the value it contained before you scratched the directory. Since you'll need to leave the write-protect notch on the disk uncovered to do this, I should also warn you not to write anything else on the disk, or it will overwrite the scratched files.

If you're thinking of doing this as an anti-copying trick, I don't recommend it; the chances are too great that an unskilled user will lose information, and the technique does not prevent the disk from being duplicated.

Q: **I have a Commodore 1541 drive that won't save any programs I write. It does, however, save a file through my word processor or from my terminal program. That killed the theory I originally had—that my head is out of alignment. What could it be and what can be done about it?**

Jeffrey Luckett
Rutherford, NJ

A: If your disk drive is able to save files written by other programs, but not programs you write yourself, it's almost certain that the problem is in the syntax of your command, not in the disk drive itself. Here is the correct syntax (wording) to use when saving to a Commodore-compatible disk drive a Basic program you have written on a Commodore computer:

```
SAVE "0:MYPROGRAMNAME",8
```

Replace MYPROGRAMNAME with your own chosen filename of up to 16 characters. When you press the return key, the disk drive motor should start up and run for a short time. When it stops, look at the front of the disk drive. If no lights are flashing there, you've successfully

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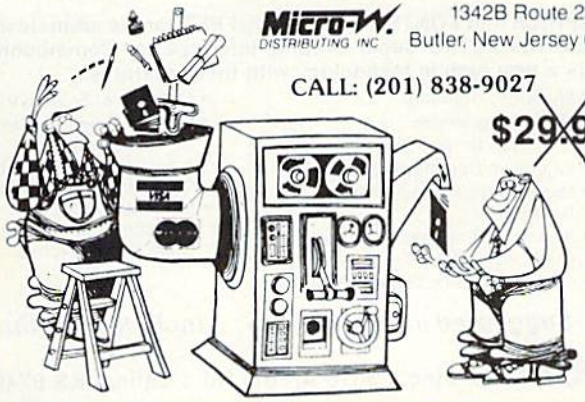

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saved your program. Otherwise, you have another problem.

The most common problems in such cases are failing to format a brand new disk before trying to use it to save programs and trying to save on the same disk two programs with the same name. It's also possible you have included an illegal character in your filename. To be sure, start out by limiting your filenames to the 26 letters of the alphabet.

Q: I am writing an inventory program for vending machines. Each machine is saved in a separate sequential file. I would like to get a listing of all machines without entering each filename individually. Is this possible? Also, how can I change just one field in a file?

E.H. McCuaig
San Mateo, CA

A: To list all the sequential files in order, without reentering their names each time, you could keep the filenames in an array that is itself saved as a sequential file and automatically reloaded when the program runs.

However, another approach is simpler, and it's the easiest way to change only one field in a file. Simply replace your sequential files with a single relative file that keeps data for each machine in one or more records. If each vending machine is allocated with enough records to hold each field in a separate record, you can easily edit any one field.

Q: Can a Basic program contain an On. . .Goto command on more than one line? A program that does this was written for the Apple, but I've heard it will also run on other computers.

Michael Feeney
Roswell, GA

A: On Commodore machines an On. . .Goto combination is limited to about 14 destinations, due to the requirement that commands fit entirely within the 80–88 character size of the input buffer. Apple's input buffer is 255 characters, which can lead to problems when converting long lines.

Fortunately, there is a simple solution. Just follow one On. . .Goto line with another, changing the expression between the words On and Goto. For example, instead of saying,

```
10  ON X GOTO 1,2,3,4,5,6,7,8,9
```

you may also say,

```
10  ON X GOTO 1,2,3,4,5
11  ON X-5 GOTO 6,7,8,9
```

Both versions work in the same way, but the second shows how to convert a line that is too long into two or more shorter lines.

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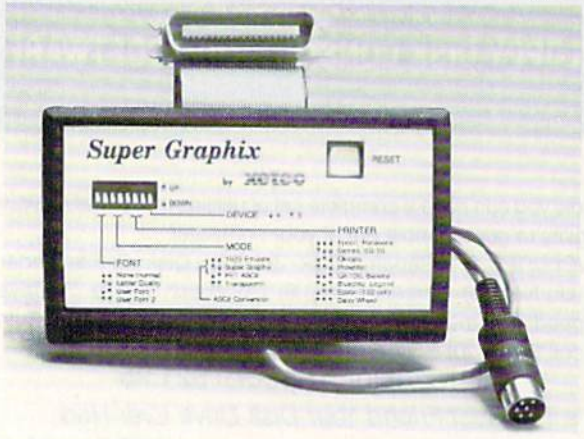

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Wally Wolf
Lewiston, ID

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While you have the drive open, clean the head itself with a Q-tip dipped in 90% Isopropyl alcohol. As for the foam piece, as soon as you can find a replacement, do so. The cost will be minimal, but only dealers who service drives themselves are likely to stock them, and some of them may insist on replacing the pad themselves. R

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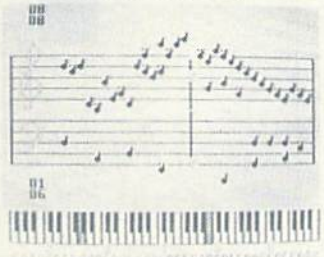

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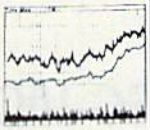

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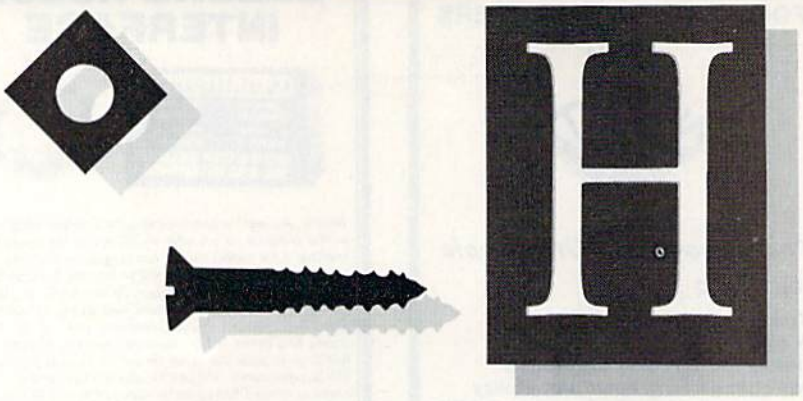


Compiled by SUSAN TANONA

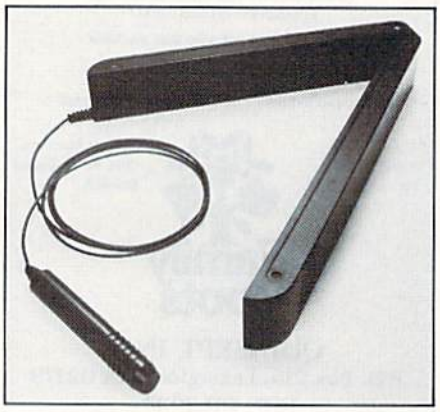
Space Pen

Welcome to the Future—Space-Age Technology Comes to Your Commodore

The Space Pen, manufactured by Soniture, Inc., is the most fascinating new peripheral I've seen in a long time. It comes in two parts: an ultrasonic receiver housed in an L-shaped frame; and a matching transmitter that is shaped like a thick-barreled pen. You fasten the receiver to the side of your monitor (so that it frames two sides) and plug it into joystick port 1.

When you point the pen toward the screen and press its switch, the receiver module triangulates the location of the signal and correlates it to a spot on the screen. With the proper software, you can use the device to draw, manipulate sprites or choose items from a menu.

Since the pen works with any program that uses a touch tablet and may work with programs that use trackballs and paddles, there is software already commercially available. I tried the pen successfully with Koala-Painter, Blazing Paddles and Music Studio.



Unfortunately, the Space Pen costs $150. I like the device, but I don't think it offers the majority of users enough advantage over touch tablets or light pens to justify this relatively high price.

For drawing, I like light pens better than any other input device (except a mouse). The Space Pen has the same natural action—pointing. Unlike light pens, it is not color sensitive, nor does it have to be held at a precise angle. You can even point from below screen level.

The pen might be especially good for children who have trouble manipulating more demanding input devices. It works at a distance of up to six feet away from the screen (longer than the cable it comes with). The cursor position wobbles a little as you move farther away.

The Space Pen is less precise for drawing than even my least expensive light pen, and it is more difficult to control for detail than a touch tablet. If you need a good input device for drawing, the Space Pen will probably not satisfy you as well as the Flexidraw Light Pen, which is about the same price, or the Koala-Pad, which currently costs about one-third as much.

I like to use the Space Pen for menu selection and for moving pointers around the screen. It is an ideal device for a teacher who uses a large-screen display monitor and wants to operate a program without blocking the screen. The pen can also be useful as a pointer and screen changer for business presentations. If software for such applications is developed for the Space Pen, its price would be moderate for its potential value.

As a gadget, I find the Space Pen compelling. It is comfortable to use and so natural that it is virtually transparent as an input device. Unfortunately, with the software that I tried, it worked only fairly well for detailed drawing. It is not cost effective for home use; however, it has good potential as a display controller for schools and businesses, provided that software that exploits its unique qualities becomes available. *(Soniture, Inc., 2146 Paragon Drive, San Jose, CA 95131. C-64, C-128, VIC-20/$150.)*

Annette Hinshaw
Tulsa, OK

SG-10C Printer

Star Micronics Offers You Handsome Print and Commodore Compatibility

The SG-10C printer is an offspring of the popular SG-10/15 parallel printers introduced earlier this year by Star Micronics. It shares many of the SG-10's features, such as a ten-inch carriage, a 2K print buffer, a rapid 120-cps print speed in Draft mode and a handsome Near-Letter-Quality (NLQ) print option. What is probably of the most interest to Commodore owners is the fact that the SG-10C is Commodore-dedicated (the C stands for Commodore), designed to be used exclusively with

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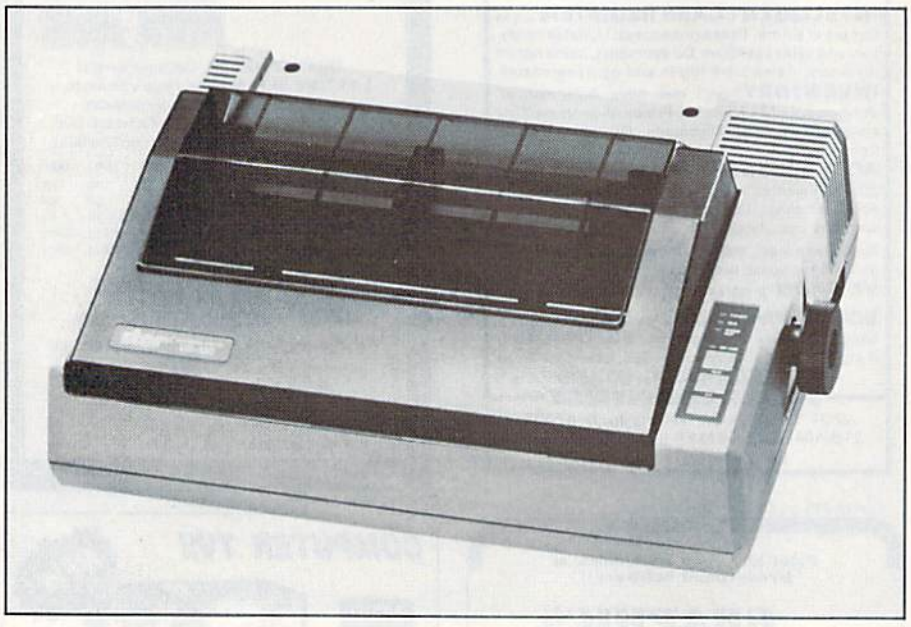

Commodore's C-128, C-64, Plus/4, C-16 and VIC-20.

This is a serial printer that comes complete with a six-pin DIN cable. As you don't encounter the added cost of buying a parallel printer interface with the SG-10C (as you do with the SG-10), the final cost of the two printers is almost identical. The SG-10C is a very user-friendly machine that both novices and professionals will discover offers many useful features. The SG-10C's overall appearance and sturdy construction are of exceptional quality.

Standard features include a removable tractor-feed unit, easily accessible DIP switches and a button that accesses the NLQ mode. This button is located in a dominant position on the control panel, which I believe encourages use of the mode.

The SG-10C would be an especially good choice for an office environment. The printer offers a variety of printing modes that are accessed by the DIP switches and ASCII control codes.

I found the user's manual helpful in learning which DIP switch controlled what print mode. The comprehensive listings of control codes, complete with examples, are a big help. Unfortunately, obvious misspellings and awkward grammar in the manual do detract from the overall quality of the product.

The printer's ability to switch back and forth among printing-text options is exceptionally quick and effortless, with simple, easy-to-memorize commands. You have a choice of italics, emphasized and condensed print. If print-head and ribbon longevity is not a major concern to you, and you don't need a print speed of 120 cps, then I suggest that you leave the NLQ mode active whenever possible, as it offers clearly defined characters, especially for a printer in this price range. You might have a difficult time distinguishing these characters from true letter-quality print.

The SG-10C offers a Business and a Graphics mode. The Graphics mode reproduces all the Commodore graphics characters with 6- × 8-dot resolution in the Draft mode. Business mode converts some of the Commodore graphics to lowercase letters.

The user's manual of the SG-10C, like the manual shared by the SG-10 and SG-15, devotes two chapters to creating and downloading your own character sets. Unfortunately, the SG-10C lacks the seven high-resolution modes of the SG-10, but I'm not sure how many users would have much use for that function even if it were offered.

Programmers will appreciate such built-in functions as error-message printing and the ability to format data into user-defined tables. This is certainly a time-saving feature for rapid right and left justification and column alignment.

After using this printer on a daily basis for well over a month, I have come to realize that the SG-10C's greatest asset, its Commodore dedication, is also its greatest liability. It is easier to use than the SG-10. However, since the SG-10C is designed exclusively for use with Commodores, Commodore owners who also have non-Commodore computers might be forced to buy a more universal printer if they want both computers to share one printer.

But for the Commodore-dedicated user, no other printer in this price range can top the SG-10C for features, performance or print quality. *(Star Micronics, 200 Park Ave., New York, NY 10166. $339.)*

Tim Walsh
***RUN* staff**

Lt. Kernal Hard-Disk System

Increased Speed and Power for the Serious Commodore 64 User

If you need the ultimate in input and output speed, Fiscal Information has recently released the Lt. Kernal hard-disk system for the C-64. It is available with a ten-megabyte drive for $1595; the 20-megabyte system sells for $1995. The system consists of a hard-disk controller that plugs into the cartridge port and a 140K disk operating system that resides on the hard disk itself.

The new operating system gives programmers and other serious C-64 users a flexible and powerful operating environment with many new commands and a truly phenomenal input and output speed. The DOS is compatible with the operating system that resides in the 1541, and the system coexists with the 1541 drive connected in the serial port.

The Lt. Kernal system will load and run virtually any Basic program and many machine-language programs.

The device does not use any of the C-64's normal RAM, although it does use the RAM residing underneath the Kernal ROM.

The one drawback to this is that, since the RAM under the Kernal is taken, many commercial programs will not run on the Lt. Kernal system. This area of RAM is being used more routinely by programmers, particularly in applications and game software. This RAM had to be used by the Lt. Kernal to provide the data-transfer capabilities that are necessary to fully exploit the potential of the hard disk. A set of programs (residing in the RAM) is needed to control the expansion port and turn it into a true parallel port, making the port fully available for data transfer.

This is clearly not the peripheral for the casual user, or even the weekend hacker. It is a tool (really, a complete operating environment) for the serious programmer, large user's group, serious business user or large school system. Such a hard-disk system can make up for a multitude of other hardware limitations. The speed of loading 16K with this system (less than one second) is such that you could write a long and sophisticated program for the 64 and shuttle subroutines in and out of memory so quickly that the C-64's limited memory would not really be a restriction.

Future versions of the operating system will support a command that quickens the backing up of files from the hard drive to a floppy disk. (You can also get a tape backup system.) Fiscal Information may also provide bundled software on the drive.

The operating system in the Lt. Kernal is very sophisticated, similar to what you might encounter on a minicomputer. My overall impression of both the software and hardware is that the package is really first-rate.

Although the Lt. Kernal is something that major software houses and serious programmers will be interested in using, its penetration into other areas of the C-64 marketplace will depend on whether software manufacturers develop versions of their programs for the Lt. Kernal. If this happens, it would also bring about a decrease in the price of the drive.

The future of this impressive hard-disk system lies not only with the C-64, but with the 128 and the Commodore Amiga. Fiscal Information is working to make the drive compatible with the 128 when in the CP/M and 128 modes (it is already compatible in the 64 mode).

Overall, Fiscal Information merits an A for its first effort to develop a high-speed mass storage device for Commodore computers. I look forward to seeing further developments of the Lt. Kernal hard-disk system. *(Fiscal Information, Inc., 143 Executive Circle, Daytona Beach, FL 32014. C-64/ten-MB drive, $1595; 20-MB drive, $1995.)*

Douglas Watt
Natick, MA

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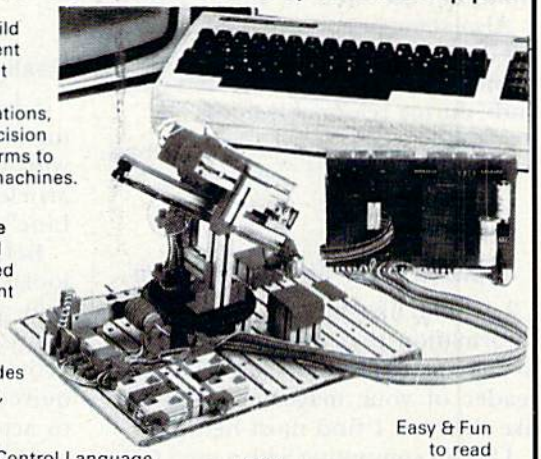

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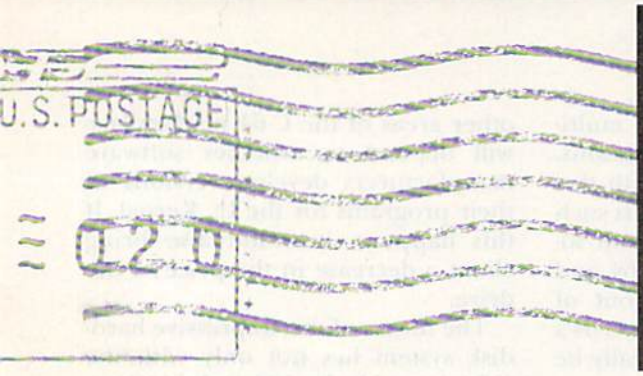

Calling for Consideration

I am writing in regard to Michael Broumberg's letter about calling user's groups (*RUN*, August 1985).

As contact for the Brooklyn Commodore User's Group, I would like to agree with him and point out additional problems. That is, those people with modems and those with auto-dial.

These people seem to call at all hours, including 2 AM; when you pick up the phone and hear a modem and hang up, the modem keeps dialing your phone. I have had the modem redialing for an hour. If these people don't know how to use modems properly and at decent hours, they shouldn't use them at all.

Also, some people call at all hours of the day and night; I try to limit my calls to other groups to evenings and weekends, during reasonable hours.

Malcolm Jay Gottesman
Brooklyn, NY

Improve Your Monitor Picture

I would like to pass along some information that may be of interest to you and your readers. As a regular reader of your magazine, it is tips like this that I find most helpful.

I began computing with a used C-64 hooked up to a small color TV. I was not at all satisfied with the clarity of the display. I thought a monitor would solve the problem, so I bought a new 1702. I was satisfied until I viewed a new C-64 hooked up to a 1702. The difference was quite noticeable.

I was so unhappy that I even considered buying a new C-64. Then I noticed an ad for a monitor improver cable from Bytes & Pieces—"Hook up your old C-64 to the new 1702... you won't be disappointed." In reality, I felt that it was just advertising hype, but it was cheaper than a new C-64 and at least worth a try.

Well, it really works, and you won't believe the difference! Anyone who has an old C-64 (5-pin plug) hooked up to a 1702 will benefit from this product. There are also other cables available. It's at least worth a test, and I feel that it's certainly worth mentioning for those who may have the same problem that I had.

The address for Bytes & Pieces, Inc., is 550 N. 68th St., Wauwatosa, WI 53213; 414-257-1214.

Carl E. Grohs, Jr.
Altavista, VA

Realign Your Disk Drive Yourself

I have just completed realigning my two Commodore 1541 disk drives with the help of Joe Shaughnessy's article, "Keep Your Disk Drive in Line" (*RUN*, July 1985).

Before reading this article, I had looked for service outlets and found only two that could do the alignments. Prices ranged from $55 to $85, provided that was all my drive required. My one drive had just started to act up and the other one hadn't worked since I purchased it (I just never got around to returning it while it was still under warranty).

After reading this article, I decided I had nothing to lose; neither drive worked, so I couldn't damage them any further if I made a mistake while following instructions.

I am by no means mechanically inclined, rather, quite the opposite. After approximately one hour, I had both drives aligned and back in working order. The hardest part was, believe it or not, drilling the holes in the bottom case so that I won't have to disassemble the drive next time. Yes, there will be a next time. I am one person who will never take a disk drive into a shop for alignment, thanks to Mr. Shaughnessy's article.

I would like to suggest to readers to go ahead and align their own drives. Provided you follow instructions, nothing should go wrong, and you'll have a lot more money in your pockets! There is really nothing to fear, and believe me, you do not need to be mechanically inclined.

Thank you very much for a fine article and over $100 in my pocket—I figure a service technician probably would have found "something else" wrong and charged me more than I was quoted.

Janet L. Shoemaker
Feasterville, PA

C-128 User's Group?

My interest in the Commodore 128 personal computer has prompted me to write to Mail RUN. I would like to start a national club/user's group dedicated to the Commodore 128 and wish to hear from others who are also interested in the C-128.

Keep up the good work, and keep us informed about the C-128.

Aaron C. Yeagle
4616 Freeland
Racine, WI 53405

Olivetti PR2300 Ink

In your August 1985 issue, a contributor to the Magic column (trick $237, p. 100) says that he has been unable to find any dry ink ampules

for his Olivetti PR2300 printer. Well, the ink ampules are available from:

Quill Corporation
100 S. Schelter Road
PO Box 4700
Lincolnshire, IL 60197-4700

The ampules are listed under "Ribbons" in their catalogue, stock number 851-122302.

Vincent J. Kopek
Virginia Beach, VA

Database Update

I found Bob Guerra's review of database management programs to be very good ("Database Management on the C-64," *RUN*, July 1985). However, in the review of Pro-Data, by Nanosec Corp., his description of the sorting limitations was not completely accurate. I own Pro-Data and am quite happy with it.

The program will sort the database by any field that you specify when printing reports or labels. You can only sort by one field at a time, and only in ascending order. For example, in my household inventory database, I can print a report sorted by location and then print another report sorted by replacement date. I can "lock" each report format to the disk and call them up whenever I need them.

Steve Kanehl
Newport News, VA

A Second Look at Word Writer

In his review of word processors (March 1985), Bill Gates describes Word Writer as a good word processing program. However, I would like to correct and clarify three basic faults he found with Word Writer:

1. Little documentation in manual: Because of Word Writer's keyboard overlays and easily understood prompts, it requires less documentation than Bank Street Writer or Creative Writer, which were also reviewed in the article.

2. Few inserting capabilities: The option chart printed in the article shows Word Writer with the same number—and even more—inserting capabilities than the two programs he recommends most highly for home word processing. Bank Street Writer, highly recommended in the article, has neither an Insert mode nor an insert key (Word Writer does).

3. Lack of advanced printing features: Again, in the same option chart, Word Writer is shown to have more printer features than Mr. Gates' favorite programs. Although Mr. Gates claims that Word Writer's printing features are basic, the option chart indicates Word Writer with advanced printing features, including character enhancement and other valuable functions.

Jessica Chipkin
Director of Advertising and Public Relations
Timeworks

Timeworks has since released an improved version of Word Writer that contains an 85,000-word spelling checker.

Editors

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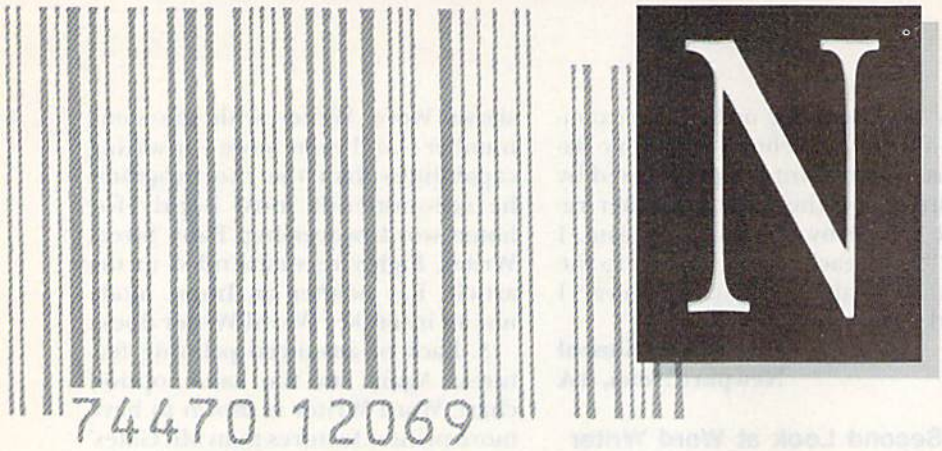


Super Pascal Development System

Super Pascal (Abacus Software, PO Box 7211, Grand Rapids, MI 49510) is a development system for the C-64. In addition to a compiler, it includes a source file editor, an assembler for coding in machine language routines and a utility package. It is available on disk for $59.95.

Check Reader Service number 400.

Write with Light

Creative Enterprises (PO Box 2477, Big Bear City, CA 92314) has released the Sure Light Pen, which comes with a tutorial program to help you write light-pen software. Its features include one-pixel accuracy, high resolution and Color Easy, to use with a free-drawing program. A game pack is included. It is available on tape or disk for $22.95 for the C-64 and VIC-20.

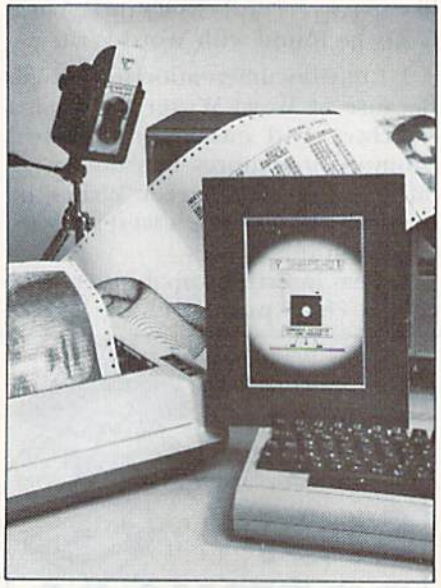
Check Reader Service number 401.

Easy Grapher

Easy Graph is a graphing program for children and first-time computer users from age eight to adult. The program allows you to create pictographs, bar graphs and pie charts and print them on most dot-matrix printers.

Easy Graph uses interactive, on-screen tutorials to explain basic graphing concepts and how to use different kinds of graphs to effectively compare numbers. Available on disk for the C-64 at $39.95. Grolier Electronic Publishing, Inc., 95 Madison Ave., New York, NY 10016.

Check Reader Service number 402.



Say "Cheese!"

Snapshot is a screen-dump utility program for the C-64 and Commodore printers. The program produces quarter- and full-page printouts (dot for dot, including sprites) and reversed pictures.

It is available on disk for $24.95 from Computer Revelations, Inc., 76 E. Ridgewood Ave., Ridgewood, NJ 07450.

Check Reader Service number 405.

A New Development

Polaroid (575 Technology Square, Cambridge, MA 02139) has released its new 5¼-inch, high-density double-sided disks, which provide 1,600,000 bytes (unformatted) storage capacity. They are available in packages of ten and retail for $82.95.

Check Reader Service number 409.

The World's Greatest Football Game

Epyx (1043 Kiel Court, Sunnyvale, CA 94089) has released The World's Greatest Football Game for the C-64.

The game lets you develop a winning game plan, then test your strategy against the computer or another person.

Available on disk for around $32.

Check Reader Service number 414.

Give Yourself Credit

Videoware (19777 W. 12 Mile Road, Suite 180, Southfield, MI 48076) has released Video Title Editor, a utility program for the C-64 and VIC-20. It creates titles, custom messages, colored screens and leaders without snow or noise.

Displays include birthdays, anniversaries, weddings and vacations. There are also displays for video movies, including credits, movie titles, Starring and Presented By. It is available on cassette and disk for $29.95.

Check Reader Service number 403.

DOS Board

Search Consultants International (PO Box 401, Haslett, MI 48840) has released DOS Board for the C-64. DOS Board allows the experienced user to simplify complex disk operating statements with the use of MS-DOS-like commands, and it increases the data transfer speed of the 1541 disk drive system.

The DOS Board keypad is interfaced to the C-64 with a single cable through the cartridge expansion slot.

Power is drawn from the computer. The 38K of available system RAM is left untouched. The board retails for $99.95.

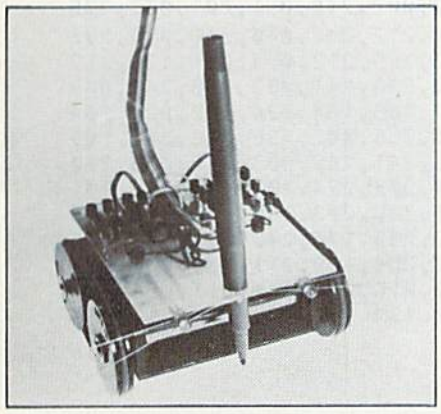
Check Reader Service number 412.

Fore!

Apcad Software (PO Box 2673, Ann Arbor, MI 48106) releases Mr. Golf for the C-64. The game is a complete 18-hole course with the standard hazards, such as trees, water holes and sand traps.

A course-design package that's included lets you select icons to create, delete and position greens, tees and hazards. Mr. Golf requires a joystick and is available on tape ($19.95) and disk ($22.95).

Check Reader Service number 422.



Micro-Kitten

Micro-Kitten, a mobile robot kit for the C-64 and VIC-20, has a range of uses, including automation modeling, transporting, drawing and gaming. Expansions include sensing devices, radio control and on-board intelligence.

The kit comes with a starter program, instructions, applications, parts and a computer interface circuit.

Micro-Kitten is available with radio control for $330 assembled. Unassembled kits are also available. Spectron Instrument, Robot Division, MS 36, 1342 W. Cedar Ave., Denver, CO 80223.

Check Reader Service number 417.

Voice Master

The Voice Master speech system, for the C-64, records your voice as digital information, which is then stored on disk in vocabulary files. Each file can contain up to 64 words, sounds or phrases.

The system is also capable of accurate voice recognition, and a voice harp program allows you to hum or whistle a melody while the software converts it into musical output.

Voice Master comes with a hardware module, a headset with microphone, system software on disk, a user's manual and accessory cables. Available from Covox (675-D Conger St., Eugene, OR 97402) for $89.95.

Check Reader Service number 426.

War from Beneath the Sea

MicroProse Software (120 Lakefront Drive, Hunt Valley, MD 21030) has released Silent Service, The Submarine Simulation, a game that simulates World War II submarine combat in the Pacific. It features multi-sub locations, such as engine room, conning tower and ship's bridge.

You can increase the complexity of the game gradually, and automatic time scaling ensures that constant decision-making is required.

Silent Service is available on disk for the C-64 for $34.95.

Check Reader Service number 406.

An Intelligent Beginning

Smart Start (Muse Software, 347 N. Charles St., Baltimore, MD 21201) is a graphics utility program that lets you design graphics and sound effects. The program then automatically generates the Basic code. You can also merge multiple programs into one; print out screens and programs; use Smart Start with any program you are running; and load, run, save and catalog your programs.

It is available on disk for the C-64 for $39.95.

Check Reader Service number 407.

Chips Ahoy!

K. Boufal Consulting Services (244 Fitzwater St., Philadelphia, PA 19147) is selling Commodore MOS technology integrated circuits, including the CIA and VIC I/II chips, for the C-64, C-128 and VIC-20 computers. You can buy one or more pieces, and prices vary with quantity purchased.

Check Reader Service number 419.

Speech Synthesizer

Genesis Computer (Ben Franklin Technology Center, Lehigh University, Bethlehem, PA 18015) has released ProVoice, the latest version of its COMvoice speech synthesizer for the C-64.

ProVoice speaks an unlimited English vocabulary and contains text-to-speech translation. Its features include screen echoing (which allows any Basic program to become a talking program) and variable translation modes for conversational, verbatim and character-by-character speech output. The ProVoice speech synthesizer is available for $99.95.

Check Reader Service number 420.

Essex

Broderbund Software (17 Paul Drive, San Rafael, CA 94903) has combined the novel with the home computer to create its series of electronic novels for the C-64.

In Essex, you must deal with the carnivorous Hamster People, evil Vollchons and other horrors on an isolated planet to save the one scientist capable of stopping the destruction of the universe. Different outcomes to the game are possible. Available on disk for $39.95.

Check Reader Service number 404.

Tic-Tac-Max

Tic-Tac-Max, a game that expands upon traditional tic-tac-toe, has been released for the C-64 and C-16. The game divides into four quadrants each of the nine squares of the tic-tac-toe game board. You score points by filling quadrants and earn extra points by filling adjacent quadrants and forming three-in-a-row patterns.

Available on disk for $19.95 from SourceView Software International, 835 Castro St., Martinez, CA 94553.

Check Reader Service number 415.

How to Type in C-64 Listings from *RUN*

Type in 64 Perfect Typist (see Listing 1) and save it to either tape or disk before running it. If you make a mistake entering the Data statements, a message will be printed on your screen. Correct any errors and save the new version.

When you want to type in a C-64 program from *RUN*, first load and run 64 Perfect Typist. Two SYS numbers will be displayed on your screen. Jot these down and keep them handy. They are the SYS numbers for deactivating the checksum and reactivating it.

You might want to deactivate the checksum in the middle of your program entry for some reason. The only way to accomplish this, besides turning off the power, is to type SYS 40794 and press the return key.

After 64 Perfect Typist has been loaded and run, start typing in your program lines just as you normally do. The only difference is that after you have pressed the return key to log in your line, a one-, two- or three-digit number will appear below the line on the left-hand margin. This number, the checksum, will be from 0 to 255.

If the number matches the checksum value given in the program listing, the line is correct, and you can type the next line right over the previous line's checksum value. If the checksum values are different, look through the line for typing or spelling errors. Make any needed changes and hit the return key again. Continue until the program is finished.

When you have entered your program, disable 64 Perfect Typist (by typing the SYS disable number that is shown on the start-up screen), and then save the program as usual. If you run the program and get an Out-of-Memory error, turn the computer off and back on. This will clear 64 Perfect Typist out of memory.

You may save part of a program at any time and continue later. If you've already turned your computer off, you'll have to reload and rerun 64 Perfect Typist, then reload the program you were working on, list it and continue where you left off.

How to Type non-C-64 Listings from *RUN*

For listings other than C-64, we have translated everything we thought might be confusing in any program. When you see something between the curly brackets, all you have to do is press the keys indicated. For example:

{SHIFT L}—means hold down the shift key and press the L key.
{COMD J}—means hold down the Commodore key (it is on the lower left side of the keyboard) and press the J key.
{SHIFT CLR}—hold down the shift key and press the CLR/HOME key.
{HOME}—press the CLR/HOME key without shifting.
{CTRL 6}—hold down the control key and press the 6 key.
{FUNCT 2}—function 2 (in this case, you hold down the shift key and press the function 1 key).
{CRSR UP}{CRSR DN}{CRSR LF}{CRSR RT}—these are the four cursor directions.
{UP ARROW}—means the arrow key (the one with the pi sign under it).
{LB.}—the British pound sign (£).
{PI}—the pi sign key (π); (shift and press the up-arrow key).

In some instances, when numerous characters or spaces are repeated, we will represent them this way: {22 spaces} or {17 CRSR LFs}.

Listing 1. *64 Perfect Typist program.*

```
1Ø POKE56,PEEK(56)-1:POKE52,PEEK(56):CLR
2Ø PG=PEEK(56):ML=PG*256+6Ø
3Ø FORX=ML TO ML+154:READD:T=T+D:POKEX,D:NE
   XT
4Ø IFT<>16252 THEN PRINT"ERROR IN DATA...":
   END
6Ø POKEML+4,PG:POKE ML+1Ø,PG:POKE ML+16,PG
7Ø POKE ML+2Ø,PG:POKE ML+32,PG:POKE ML+38,P
   G
8Ø POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}**************
   **********************"
9Ø SYS ML:PRINT "{CRSR RT}** 64 PERFECT TYP
   IST IS NOW ACTIVE{2 SPACEs}**"
1ØØ PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACEs}
    SYS"ML+3Ø"=OFF **"
1Ø1 PRINT"{CRSR RT}**********************
    **************":NEW
11Ø DATA 173,Ø05,Ø03,2Ø1,Ø03,2Ø8,Ø01,Ø96
12Ø DATA 141,1Ø5,Ø03,173,Ø04,Ø03,141,1Ø4
13Ø DATA Ø03,162,1Ø3,16Ø,Ø03,142,Ø04,Ø03
14Ø DATA 14Ø,Ø05,Ø03,Ø96,234,234,173,1Ø4
15Ø DATA Ø03,141,Ø04,Ø03,173,1Ø5,Ø03,141
16Ø DATA Ø05,Ø03,Ø96,Ø32,124,165,132,Ø11
17Ø DATA 162,ØØØ,142,24Ø,Ø03,142,241,Ø03
18Ø DATA 189,ØØØ,ØØ2,24Ø,Ø51,2Ø1,Ø32,2Ø8
19Ø DATA Ø04,164,212,24Ø,Ø4Ø,2Ø1,Ø34,2Ø8
2ØØ DATA Ø08,Ø72,165,212,Ø73,Ø01,133,212
21Ø DATA 1Ø4,Ø72,238,241,Ø03,173,241,Ø03
22Ø DATA Ø41,Ø07,168,1Ø4,Ø24,Ø72,Ø24,1Ø4
23Ø DATA Ø16,Ø01,Ø56,Ø42,136,Ø16,246,1Ø9
24Ø DATA 24Ø,Ø03,141,24Ø,Ø03,232,2Ø8,2ØØ
25Ø DATA 173,24Ø,Ø03,Ø24,1Ø1,Ø2Ø,Ø24,1Ø1
26Ø DATA Ø21,141,24Ø,Ø03,169,Ø42,Ø32,21Ø
27Ø DATA 255,169,ØØØ,174,24Ø,Ø03,Ø32,2Ø5
28Ø DATA 189,162,Ø04,189,211,Ø03,Ø32,21Ø
29Ø DATA 255,2Ø2,Ø16,247,164,Ø11,Ø96,145
3ØØ DATA Ø13,Ø32,Ø32
```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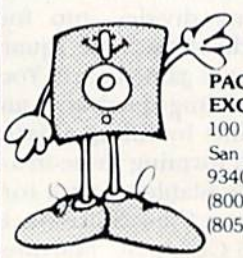

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RUN AMOK

Item: In Magic's Printer Trick, on p. 156 of the Special Issue (published in January, 1985), in line 1, J = IT0255 should read J = IT0255.

Item: In the listing for Easy Assembly III (August 1985, p. 59), line 1500 is incorrect. It should read: 1500 DATA 188,LDY – X,3

Item: In Memory Jogger (July 1985, p. 61), Line 1000 in the listing should read GOTO19.

New Products RUNdown

Software for the C-128

Timeworks (444 Lake Cook Road, Deerfield, IL 60015) releases three utility programs for the Commodore 128 computer.

Word Writer 128 includes a spelling checker of 85,000 words, document chaining, form-letter printout, page separations and horizontal and vertical scrolling.

Data Manager 128 is a general information storage and retrieval system with report-writing and label-making capabilities.

Swiftcalc 128 with Sideways, for home and small-business users, lets you print an entire spreadsheet vertically, with complete control over margins and spacing between characters and lines.

These three programs are fully integrated and will interface with one another. Each program is available on disk for $69.95. (See reviews in this issue.)

Check Reader Service number 411.

Writer at Play

Adventures in Space (Woodbury Software, 127 White Oak Lane, CN# 1001, Old Bridge, NJ 08857) is a creativity package that helps your child to create his or her own space epic.

The program uses write and revise commands to create the story, prints out the finished tale, and the package includes stickers and full-page art to illustrate your child's story, which can then be inserted between hard covers. Available on disk for the C-64 at $39.95. Refill packs are $9.95 each.

Check Reader Service number 413.

Football Fantasies

Computer Quarterback, a software game for the C-64, lets you play the semi-pro or pro versions of football. The semi-pro version gives you 18 offensive and 14 defensive plays so you can practice the intricacies of football strategy. The pro version includes 36 offensive and 24 defensive plays.

Features of Computer Quarterback include real-time play, solitaire and two-player modes, and semi-automated graphics display of offensive and defensive alignments. Available on disk for $39.95. Strategic Simulations, Inc., 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043.

Check Reader Service number 410.

Get the Edge

The Management Edge is a self-help program that gives you specific directions on managing the people you work with. The package helps you to increase employee motivation, solve management/employee conflicts and improve your management skills.

The Negotiation Edge program helps to provide you with a better understanding of the people with which you negotiate, and evaluate their personalities, strengths and weaknesses.

Also available in the series are The Sales Edge, to help you in your sales strategy; and The Communication Edge, to help you deal more effectively in your communications with others.

Each program is available on disk for the C-64 and Plus/4 at $79.95. Info Designs, Inc., 445 Enterprise Court, Bloomfield Hills, MI 48013.

Check Reader Service number 425.

Three from Nanosec

Nanosec (Valley West Plaza, 4185 South 300 West, Suite 12, Ogden, UT 84403) has released three programs on disk for the C-64.

Pro-Compiler ($99) skips the generation of P-code and, instead, compiles your Basic program directly into machine code.

Body Man I ($34.95) depicts the human body in detail, showing all major structures and demonstrating their physiology.

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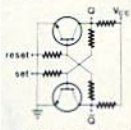

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November

COMING ATTRACTIONS

- **Hardware Buyer's Guide**—Find out what peripherals and accessories are available for your Commodore system. New products released in 1985 for the C-64 and C-128 will be categorized and listed, along with a brief description of each, its price and the manufacturer's name and address.
- **CP/M and the C-128**—Learn which versions of CP/M will run on the C-128 and how to load and run CP/M programs. A list of commercially available CP/M software for C-128 users will accompany this article.
- **Music Programs**—Explore the musical capabilities of the C-64 and C-128 (in C-64 mode) with two programs that let you create your own tunes.
- **Telecommunications**—A review of Commodore's recently announced electronic network, QuantumLink.
- **Communications Software Reviewed**—A survey of the major commercially available communications software for modem users.
- **Plus More**—Brainstorming, a program that will help you to organize your thinking; Datafile Restructure, a handy utility for use with *RUN*'s popular Datafile database; and regular features and columns to help you get the most out of your Commodore computing system.

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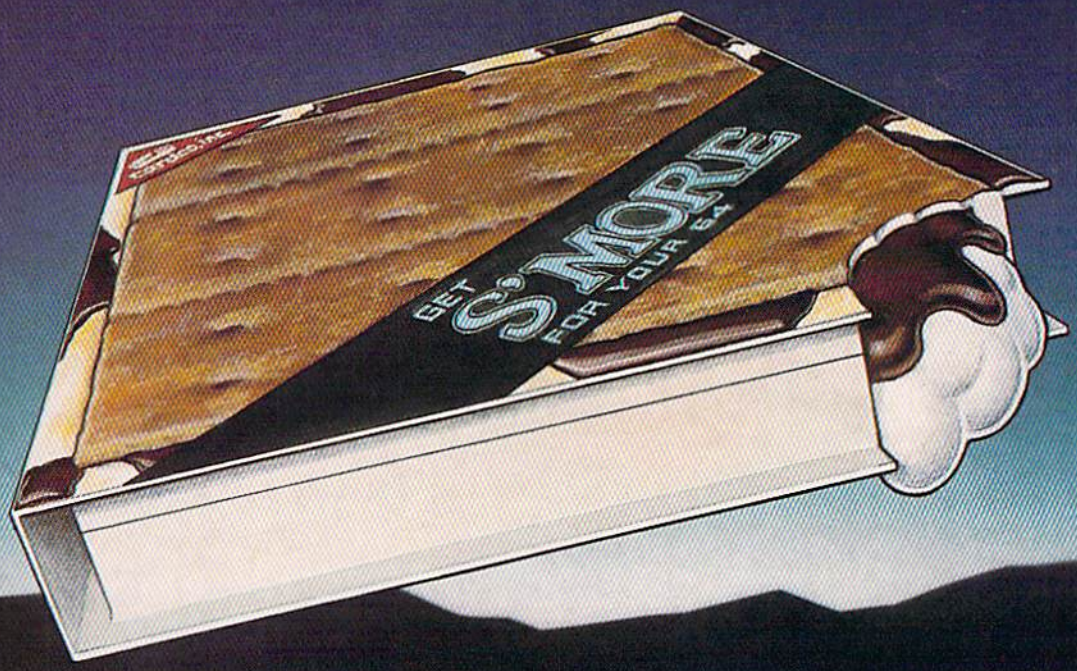

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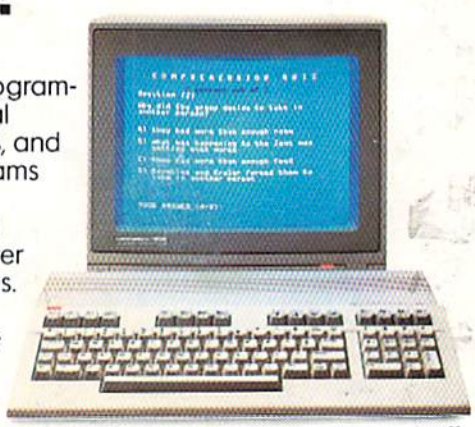

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